OCTOBER 1994
Volume 62 No 10

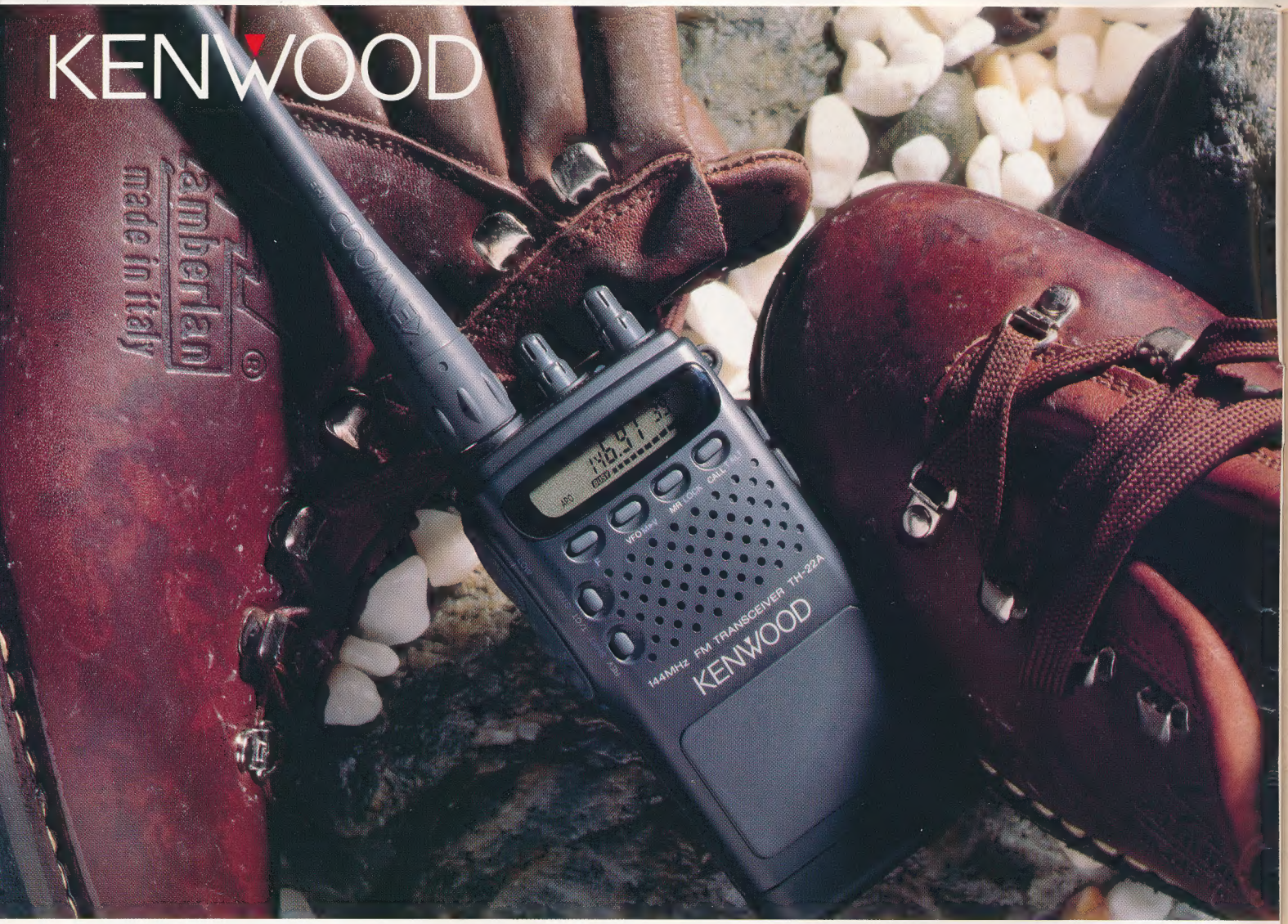
AMATEUR RADIO

Journal of the Wireless Institute of Australia

Full of the latest amateur radio news, information and technical articles including:

* An Empirical Approach to Building an HF Receiver
* VK5BR Single Coil Z Match Tuner
* Review of ICOM IC-2340H Dual Band FM Transceiver

Plus lots of other articles and special interest columns



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AMATEUR RADIO

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Vol 62 No 10 ISSN 0002-6859 October 1994

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Cover

Thirty percent of the world population of King Penguins lives on Marion Island. Sitting between breeding King Penguins is Chris ZS1COK who recently returned to South Africa after a 12 month stint on Marion Island as a radio technician. See How's DX, page 36, for more details.

Amateur Radio is published by the Wireless Institute of Australia, ACN 004 920 745 as its Official Journal, on the last Friday of each month.

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Deadlines	Editorial	Hamads
November	10/10/94	12/10/94
December	07/11/94	09/11/94
January	09/01/95	11/01/95

Delivery of AR: If this magazine is not received by the 15th of the month of issue, and you are a financial member of the WIA, please check with the Post Office before contacting the registered office of the WIA.
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A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Editor's Comment

Last month I hinted that, relating to the amateur population of a city, we might discuss those strange people who delight in disturbing other people using FM repeaters. I called them "larrikins", being in a charitable mood, but the Assistant Editor was much amused by my choice of a name." "Larrikin" hasn't been used for 50 years' he said, "You're living in the past!"

Perhaps rather than the obsolescent word "larrikin" we might talk about "anti-social lame-brained destructive misfits" but it needs too many words. They are certainly all of that, but the interesting thing is that such people are seldom, if ever, heard on repeaters in cities with less than a million population. Why should this be so?

Recently VK3s OM and ABP travelled through Adelaide, Alice Springs, Darwin, Port Hedland, Perth and back to Adelaide. About 16,000 km, and not a trace of repeater users misbehaving anywhere except in Melbourne before we left and after we returned. Adelaide's population is just over a million, Perth rather more. We know from past visits and letters received that Sydney (nearing four million) has a worse problem than Melbourne (with over three million people). Brisbane (more than a million) may still be OK. I haven't been there for about six years so my personal knowledge is outdated.

There are two possible reasons at least for this population effect. Firstly, radio amateurs and would be amateurs are only about one in 1000 of the population Australia wide. People psychotically impelled to create disturbances are also about one in 1000. Consequently radio vandals are a vanishingly small minority of perhaps one person, in a city of a million. And people of this kind depend on the mob-psychology of like-minded companions. With one there is no great problem; with two they back each other up!

Furthermore, most of the amateurs in a smaller city are personally known to each other, so anti-social people are more likely to be restrained by peer-pressure. In a larger city they are more anonymous, better hidden from the law-abiding majority.

Now, and more recently, those with anti-social tendencies and others who may be well-meaning but reckless have been given the blank pages of packet on which to display their opinions. The result has been a welter of twaddle, often defamatory! Unfortunately it covers the whole country, and unlike verbal vandalism it stays on bulletin boards or in hard copy for days or weeks, with the further complication of anonymous authors purporting to be someone else. These problems are being addressed but their complexity (involving technical, legal and regulatory aspects) means that progress must be slow.

To conclude on a happier note. Our VHF/UHF columnist Eric Jamieson VK5LP will complete 25 years of writing his column next month. This must be an all-time record and Eric deserves our hearty congratulations. Do you plan to aim for 50 years now, Eric?

Bill Rice, VK3ABP
Editor
ar

■ Receivers

An Empirical Approach to Building an HF Receiver

*Drew Diamond VK3XU**

Have you built a number of radio and electronics projects? Maybe a linear amplifier, or a transmitter perhaps. If you are contemplating having another go at some "home brew", a receiver project comes highly recommended. Not only will a useful item be the product of your efforts, you also gain membership of that special club of experimenters who enjoy the magical delight of exploring the HF bands with a receiver that you have made yourself. And to make the project even more interesting, cost can be held to low limits, in true amateur fashion, depending upon scavenging prowess.

A well-made direct conversion (DC) receiver can give surprisingly good performance, and will be adequate for uncrowded band conditions. However, for a band packed with strong and weak signals, "single-signal" reception (ie some sort of IF filtering) is necessary to sort them out. Single-signal DC sets have been built and described, but are, I feel, more complex and difficult to construct than an "equivalent" superhet design.

What follows are a few notes and a suggested circuit using locally available components, drawing upon my own practical work, and that of many other experimenters. An extensive bibliography of topical further reading is appended for those with a wish to burrow more deeply

WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

Division	Address	Officers			Weekly News Broadcasts	1994 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Rob Apathy Len Jones Don Hume	VK1KRA VK1NLJ VK1DH	3.570 MHz LSB, 146.950 MHz FM, 438.525 MHz FM each Monday evening (except the fourth Monday) commencing at 8.00 pm. Repeated on Wednesday evening at 8.00 pm on 146.950 MHz FM.	(F) $70.00 (G) (S) $56.00 (X) $42.00
VK2	NSW Division 109 Wigram Street Parramatta NSW (PO Box 1066 Parramatta 2124) Phone (02) 689 2417 Freecall 1800 817 644 Fax (02) 633 1525	President Secretary Treasurer (Office hours	Michael Corbin Terry Ryeland Mon-Fri 11.00-14.00 Wed 1900-2100)	VK2PFQ VK2ZRH VK2UX	From VK2WI 1.845, 3.595, 7.146*, 10.125, 24,950, 28.320, 52.120, 52,525, 144.150, 147.000, 438.525, 1281.750 (*morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1030 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 70 cm, 23 cm. Voicemail highlights on (02) 724 8739. Some broadcast text is occasionally available on packet.	(F) $66.75 (G) (S) $53.40 (X) $38.75
VK3	Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer (Office hours	Jim Linton Barry Wilton Rob Hailey Tue & Thur 0830-1530)	VK3PC VK3XV VK3XLZ	1.840MHz AM, 3.615 LSB, 7.085 LSB, 53.900 FM(R) Mt Dandenong, 146.700 FM(R) Mt Dandenong, 146.800 FM(R) Mildura, 146.900 FM(R) Swan Hill, 147.225 FM(R) Mt Baw Baw, 147.250 FM(R) Mt Macedon, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday.	(F) $72.00 (G) (S) $58.00 (X) $44.00
VK4	Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (07) 284 9075	President Secretary Treasurer	Murray Kelly Lance Bickford Roger Bingham	VK4AOK VK4ZAZ VK4HD	1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz. 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) $72.00 (G) (S) $58.00 (X) $44.00
VK5	South Australian Division 34 West Thebarton Road Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Garry Herden Maurie Hooper Bill Wardrop	VK5ZK VK5EA VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT) 3.555, 7065, 10125, 146.700, 0900 hrs Sunday	(F) $70.00 (G) (S) $56.00 (X) $42.00
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 434 3283	President Secretary Treasurer	Cliff Bastin Ray Spargo Bruce Hedland-Thomas	VK6LZ VK6RR VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.	(F) $60.75 (G) (S) $48.60 (X) $32.75
VK7	Tasmanian Division 148 Derwent Avenue Lindisfarne TAS 7015 Phone (002) 43 8435	President Secretary Treasurer	Andrew Dixon Ted Beard Peter King	VK7GL VK7EB VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) $69.00 (G) (S) $55.65 (X) $40.00
VK8	(Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).					

Note: All times are local. All frequencies MHz.

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into the material touched on here, and have access to a State, Engineering, or Technical Library.

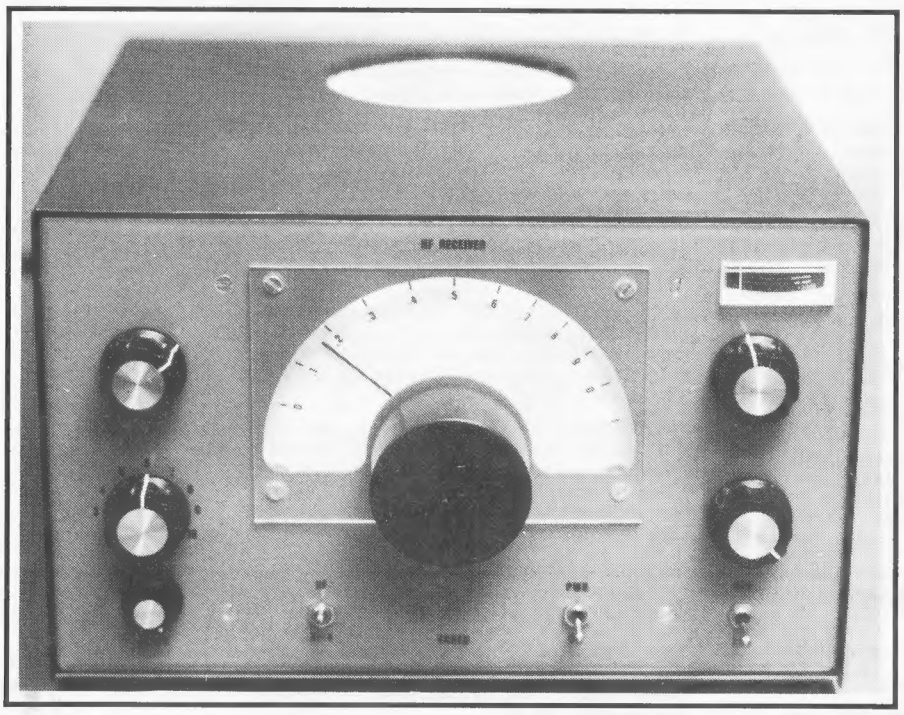
In the late 60s and early 70s, valve circuit technology had evolved to a point where receivers with impressive signal handling characteristics were the norm. Many amateur-built and commercial sets featured at least one 7360 balanced modulator valve, arguably the best HF receiver mixer ever to be mass-produced. Consequently, at about that time, when solid-state receiver designs began to be published, "transistorised" sets quickly gained a reputation for poor strong-signal performance, and were not a patch on their older valve rivals. Various solid-state devices gradually became available that gave acceptable performance, including the CA3028 (singly balanced), the 1496 balanced mixer IC, 40673 dual-gate FET, and the diode ring. Many "serious" experimenters still favour the diode ring. However, in my opinion, they have several disadvantages; a rather large oscillator signal level is required (typically 5 mW), a conversion loss of about 8 dB is incurred, impedance levels are low (typically 50 ohms nominal), and therefore close attention must be paid to impedance matching for all products if the desired high level performance is to be realised. Nevertheless, moderately priced diode modules (eg the SBL-1) are available, and many published designs make use of the diode mixer. There are "strong" active balanced mixers, including the SL6440 and SD8901/Si8901. Unfortunately, these devices are costly and not (at present, as far as I know) easily available in small quantities in this country, although supply should improve.

Most of the circuits we see here are European and American designs, which must cope with the thousands of powerful HF transmitters in those areas. Every amateur in the USA for instance, if you read QST, seems to have three neighbours just around the corner, each with a kW amplifier. Not a good environment for a weak receiver. In this region, however, things are a little more relaxed, and in most instances we can generally get by with a less bomb proof, but far more buildable, design.

Enter, stage left, the diminutive NE602 balanced mixer IC. This little chip and I have had a 4 year friendship, and in that time I have grown to like him very much, although he has two undesirable characteristics. Firstly, he's not very strong. He may quake a bit when powerful signals are around. I've learned to live with that. By having a reserve of receiver gain (he contributes 15 dB himself), some RF attenuation "up front" generally takes care of this problem. Numerous experimenters frown on RF attenuation used like this, and regard it as a sort of "cop-out". Nevertheless, it has gained acceptance, and even some manufacturers use an attenuator. On HF, natural and man-made noise will usually be greater than the receiver front-end noise, so the point is perhaps fairly academic. Secondly, the 500 MHz bandwidth of the device makes it rather prone to TV and FM radio pick-up where the transmitters are close by. Building the receiver in a metal box, and including a 30 MHz low pass filter (if found necessary) takes care of this problem.

The first mixer must deal with all signals which pass through the input filter from the antenna. A doubly balanced mixer will considerably improve strong signal handling, and offer improved attenuation of any signals at IF. The NE602 is acceptable in this regard if the input signal is applied, and output product extracted "in balanced mode". I believe this is one aspect which is perhaps overlooked by some NE602 detractors. The product detector has only to deal with those signals which arrive through the IF crystal filter, so a dual gate FET will do a fair job if high input impedances are required, or a second NE602 would be fine if the 1.5 kohm input and output impedances suit the circuit arrangement.

For most amateur applications, an IF bandwidth of about 2 kHz is required, which is readily obtainable with a home-made crystal ladder filter. Using cheap computer crystals, a four-crystal filter, plus one for the BFO, will cost about $16 at present. The quartz units are manufactured in huge batches, and match each other very closely in frequency. Out of band attenuation can be improved by building the filter in its own little compartmented box. The bandwidth is largely determined by the value of coupling capacitors, and is best found by experiment. For 6 MHz crystals, 33 pF will give a 1.8 kHz BW, whereas at 8 MHz, about 220 pF will be required. Reducing capacitance



"Computarock" II receiver.

increases BW. Obtain your crystals from one source, and check that they are all of the same make.

We must be very careful in our choice of intermediate frequency (IF) and conversion crystal frequencies, always keeping in mind which bands need to be birdie free. Remember, a receiver is a sub-microvolt sensitive device. Harmonics of the VFO, the BFO crystal, and mixing products of these and any converter crystal (if in use) can produce bothersome spurs at spots in the tuning range. Let's try an example; say we choose a crystal filter IF of 6 MHz, and our basic tuning range is to be 3 to 4 MHz. The VFO runs on the "high side", so it must generate 3 + 6 = 9 MHz, to 4 + 6 = 10 MHz. The BFO crystal is on about 6 MHz. Now the second harmonic of the VFO (when tuned to receive 3 MHz) is 18 MHz, and the third harmonic of the BFO is 18 MHz, so we (may) get a growl type birdie right on the 3 MHz band edge.

Do not choose an IF which is included in a wanted band, or forces adoption of a VFO or BFO frequency where these signals, or a harmonic, put internally generated carriers smack into a wanted band. So spend some time and do the arithmetic, considering harmonics of both oscillators to at least the fifth, then choose IF, VFO frequency range and BFO for minimum in-band spurs. Nevertheless, some sort of compromise is generally necessary. Problems can be greatly avoided by using compartmented construction for the various oscillators. Naturally, the VFO should be housed in an RF tight box, preferably die-cast, in accordance with current practice. If the BFO is also boxed up, then the likelihood of these sources "getting together" and producing unwanted products is greatly reduced. Even with a balanced mixer, and a good input filter, it is possible for very powerful signals to break through into the IF. Therefore, for instance, in some parts of this country, it would be prudent to avoid choosing 5 MHz as our IF.

Varactor diodes offer a way of obtaining the variable capacitance required for VFO and input filter circuits. However, their use significantly increases complexity, and great care is needed for a VFO application. A high quality potentiometer, preferably a multi-turn type, and a well regulated and filtered voltage supply are mandatory. Provided their larger physical size is not a big consideration, ordinary variable capacitors allow us to keep things fairly simple, and understand more fully what's going on. The resourceful builder should not have great difficulty in obtaining suitable parts. There generally seems to be a number to choose from at the hamfests I have seen (see Parts). The main problem now is that of finding a really good dial and/or reduction drive. If you choose a round numbered IF, then a well shielded electronic counter can do duty by simply measuring the VFO frequency (those kHz digits to the right of decimal point), and perhaps applying the appropriate plus or minus correction factor, depending on BFO setting. Then a planetary or worm

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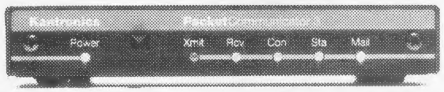

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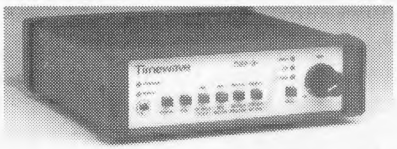

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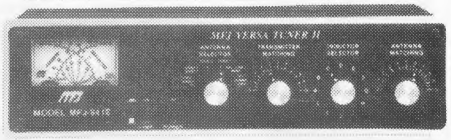

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MM011D	Vibroplex Original - chrome	$260
MM012S	Vibroplex Iambic - grey	$240
MM012D	Vibroplex Iambic - chrome	$260

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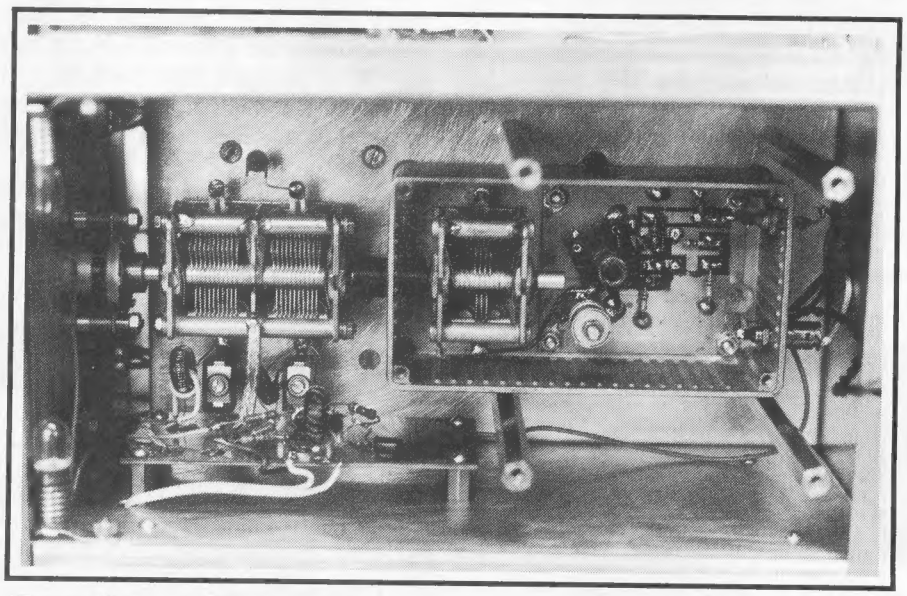
drive can do the gearing down. Quite reasonable resolution and reduction can be had with a conventional 6:1 planetary dial if you only need to tune say, 200 kHz. However, for a 1 MHz coverage (as a "tunable IF" for example), a decent dial will be called for. One from an old BC-221 frequency meter is a fine example. As far as I know, there are no really adequate dials available "off-the-shelf" although, once again, they do appear for sale at hamfests and white elephant sales.

It was probably Wes Hayward W7ZOI who made popular the term "ugly construction". Also called "point to point", "rat's nest", "bunch of grapes"... not very flattering names for a construction method that, with a little care and practice, can yield quite satisfactory results. More than a few would-be builders have a sort of "no circuit board, no build" attitude, which is a pity, because more stable operation can usually be obtained in HF circuitry by adopting the ugly method, and construction time is considerably reduced. Furthermore, if something is wrong, or some improvement is to be added, then it is a simple matter of soldering in the necessary components. So, true experimenting is encouraged. With a circuit board, "the die is cast" and any changes are difficult and messy.

ICs may be inserted into wire wrap sockets. The NE602 for instance, has pin 3 at ground, so leave that pin pointing straight down, and gently flare out the remaining 7 pins. Now pin 3 can be soldered direct to ground foil. Components which have one leg to ground are sufficient in number to provide anchor points for the remaining components. Try to keep it all on a low profile. FETs and transistors are sometimes better positioned up-side-down. The emitter resistor for instance, may well provide the first anchor, so clip one lead, and solder that end to foil using the unclipped lead as a "handle". High value resistors, say 4.7 megohm with one lead soldered to foil, may be used where no actual circuit component is available. If there is a possibility of components shorting to foil, stick a little square of tape onto the board. The circuit can be quickly built up this way. Mechanical support for heavier components, such as toroidal coils, may be obtained if necessary, with double-sided tape, or a small blob of acid free silicone.

A toroidal coil hint: where the plan calls for, say, 47 turns of # 26 B&S on an Amidon T50-2 core, estimate the length of wire required by adding up height and thickness of the core dimensions. For a T50-2 it is 5 + 3 + 5 + 3 = 16 mm, then multiply by the number of turns; 47 × 16 = 752 mm. Let's make it 800 mm allowing for leads and errors. Uncoil about 400 mm from the spool and start looping them through. You may get 25 turns on. A quick mental estimation will now tell you where to cut the wire, and wind on the remaining turns.



RF amplifier and VFO assemblies.

For the VFO tank coil, avoid using toroidal cores, or any magnetic core for that matter. In addition to their unpredictable temperature characteristics, they have a nasty tendency to pick up stray 50 Hz flux from power transformers, and so "FM" the VFO frequency. A plain solenoid coil on a bakelite, ceramic or PTFE former is ideal. The coil should be placed at or near the centre of the VFO box, thus minimising coil losses and microphony effects.

For applications such as oscillators and filters where stability and low loss is desired, use polystyrene, NP0 or silver mica fixed capacitors. Unmarked, unknown capacitors have no place in such circuits, and it is false economy to press them into service; think of the time you may waste trying to de-bug a wobbly (or won't start) oscillator. Buy new ones. Variable capacitors and trimmers should be air-dielectric, the ones with a plastic dielectric can be very drifty. Monolithic capacitors, typically 0.1 μF, do an excellent by-pass and coupling job, and are real space-savers. Take care when soldering, the leads may come adrift with too much heat. If you are working from a published design, try to use the components specified. If substitutions of so-called "equivalents" are made by you, be aware that the circuit may function differently from the original. The greatest problem areas in my experience are unsuitable core materials (slugs and toroids), capacitor substitutions, improper circuit layout, and instability caused by component crowding and attempts at trying to make the thing too small.

A 3 to 4 MHz HF Receiver

The circuit is based on the Computarock (Ref 15), with some improvements. For receivers of more than one band, general practice is to cover a basic tuning range which includes a low frequency amateur band. To tune 1 to 2 MHz (1.8 MHz), however, would have at least three drawbacks; broadcast signals may "break through" into this first IF,

image rejection would not be especially good (particularly at higher frequencies), and rather large variable capacitors may be required to obtain satisfactory tracking. A first IF (or basic range) of say, 3 to 4 MHz is much more manageable; since there are fewer powerful signals to break through, the image is at least 2 × 3 MHz (6 MHz) away, and smaller variable capacitors are required.

This is not a "high-performance" design, and no claims are made in that regard. However, it is buildable by the amateur with the usual skills and tools, and provides, perhaps surprisingly, quite acceptable performance under all but the most hostile receiving conditions. On 3 to 4 MHz, and using the suggested converter, sensitivity is in the order of 0.2 μV for 10 dB S+N:N, IF (8 MHz) rejection is over 80 dB, and worst-case image rejection (28 MHz) is 50 dB. In accord with previous notes, a crystal filter IF of 8 MHz offers spur-free operation throughout the 3 to 4 MHz basic tuning range, and also greatly avoids spur production with round numbered computer crystals if a converter is used. A sure-fire Hartley VFO runs on the "high side", 11 to 12 MHz. All bands are forward tuning, providing reception of USB/LSB SSB, DSB, CW and AM (as SSB).

Simpler superhets generally make use of the internal oscillator transistor within the '602. However, for the reasons stated above, VFO and BFO are separate boxed units with their own sets of components. This modest increase in complexity is justifiable in our pursuit of minimum spur production and satisfactory signal handling. Note that there is no IF amplifier. After the crystal filter, the signal is applied directly to the product detector.

A dual gate FET RF amplifier provides a useful degree of gain or attenuation of input signals. The source is raised to about 1.6 V by inserting an LED between source and ground. This amplifier is the only point where AGC may be easily applied, and it works pretty well. Detected audio is sampled at the output of the first '741 AF amplifier, and applied to the AGC amp, a favourite circuit which has been around for years. Although not "full" AGC, quite a useful range is obtained, and ears are certainly saved with this set-up.

Construction

Sufficient details are provided here for the experienced builder to make their own version, or to adapt circuitry as desired. My set is housed in a home-made aluminium box measuring HWD 155 × 250 × 255 mm. Good compactness, rigidity and screening between stages is obtained with one horizontal and two vertical internal panels as shown. Yet all the circuitry is accessible during and after completion. Mixer, crystal filter, AF amplifier and AGC amplifier are accommodated upon one board in the right-hand compartment together with boxed BFO, converter in the left compartment, 3-4 MHz RF amplifier and VFO in the centre, and power supply below centre.

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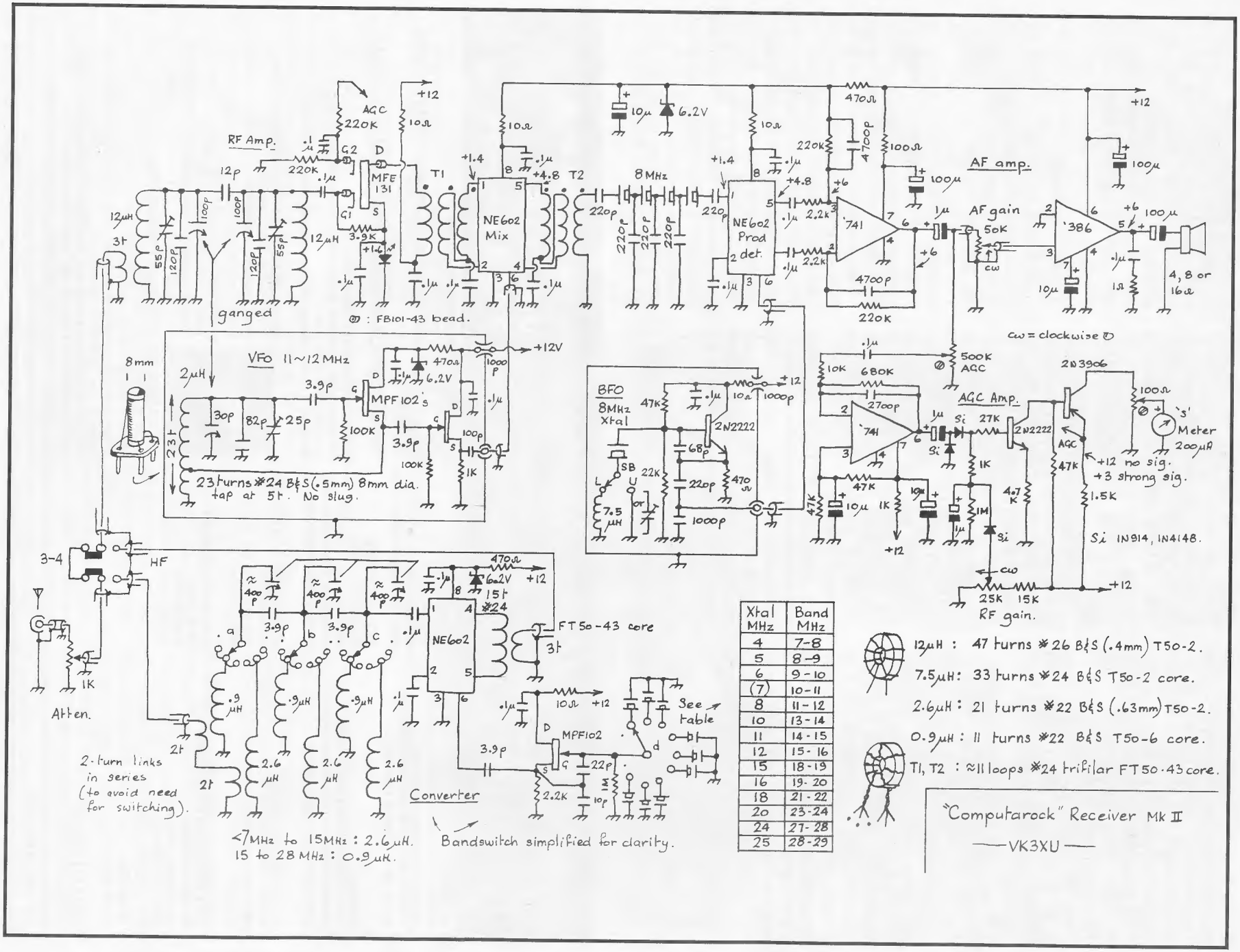


Xtal MHz	Band MHz
4	7-8
5	8-9
6	9-10
(7)	10-11
8	11-12
10	13-14
11	14-15
12	15-16
15	18-19
16	19-20
18	21-22
20	23-24
24	27-28
25	28-29

12µH : 47 turns ✻26 B&S (.4mm) T50-2.

7.5µH: 33 turns ✻24 B&S T50-2 core.

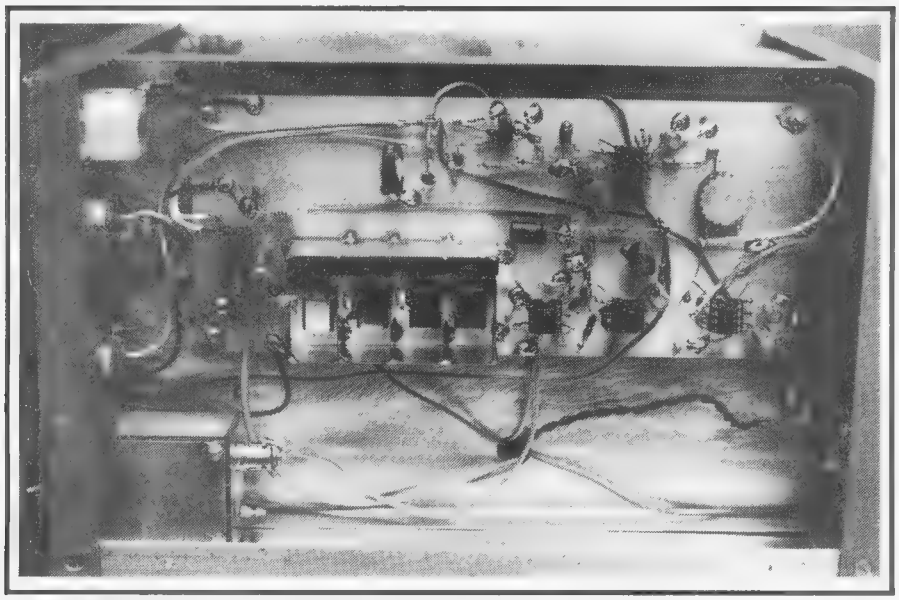
2.6µH : 21 turns ✻22 B&S (.63mm) T50-2.

0.9µH : 11 turns ✻22 B&S T50-6 core.

T1, T2 : ≈11 loops ✻24 trifilar FT50-43 core.

"Computarock" Receiver Mk II

—VK3XU—



Mixer, crystal filter, product detector and AF amplifier.

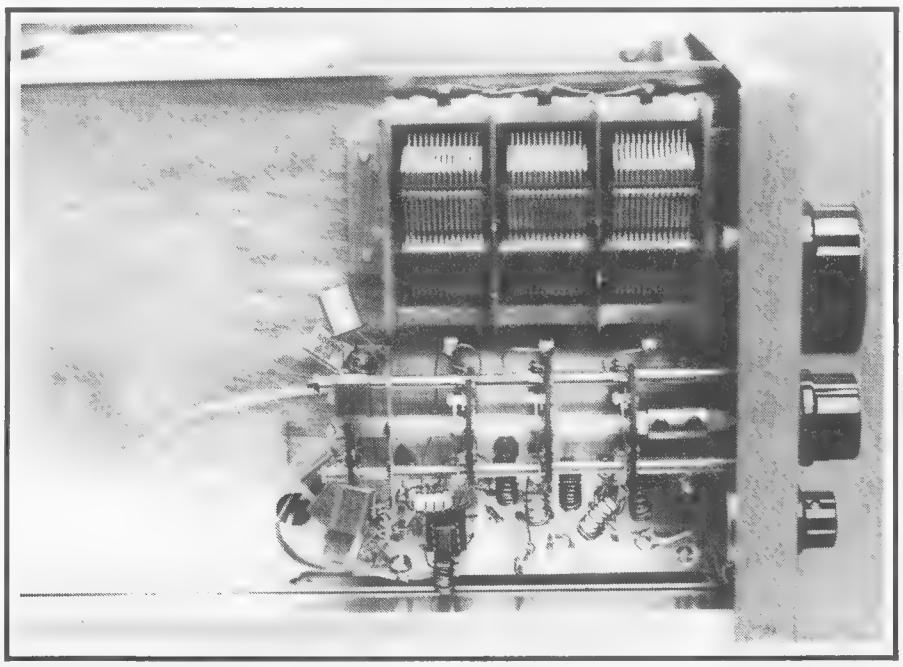
Here is where I cheat a bit, and say something along the lines of "in my junk-box I had...". Well, in this instance I did indeed have the necessary variable capacitors; a dual 100/100 pF unit, one of those superb English types with dual ball bearings and the shaft going right through, so that the VFO capacitor may be directly coupled at the end opposite the drive, and a 30 pF of the same make for the VFO. These types appear at hamfests from time to time. Look out for them, as they are very adaptable to individual requirements. Also, unlike most locally made BC type capacitors, you can arrange for clockwise shaft rotation to give a reasonably linear increase in frequency. If space permits, interpose an effective flexible coupler between the VFO capacitor shaft, and whatever is driving it. This will reduce drive wear due to any small shaft misalignment, and unwanted frequency changes being relayed to the VFO capacitor from hand pressure on the tuning knob.

A worthwhile improvement in stopband attenuation may be had by building the crystal filter into a box with compartments, made from tinplate, brass or similar. Start with one vertical partition which has a small hole near the middle, and solder it to the circuit board foil. Then crystal and capacitor, another vertical partition, and so on, thus avoiding any fiddliness in building the filter. When the five partitions and four crystals have been mounted, the longer side walls may then be attached. No need to use a lot of solder, small "tacks" will allow you to take it apart again if necessary.

The suggested converter circuit for coverage of the HF range is very similar to that originally used for the Computarock, and the reader is strongly advised to look up Ref 15 for fuller details. The table shows those bands available using cheap computer crystals. Note that when a conversion crystal of 4 MHz is used to gain access to the 7 to 8 MHz band, we have the possibility of a spur that tracks 7 to 8 MHz; when the VFO is on 11 MHz (3 and 7 MHz) we have 11 – 4 = 7 MHz, and when the VFO is at 12 MHz (4 and 8 MHz) we get 12 – 4 = 8 MHz. My rough breadboard model did indeed have a faint constant tone right across this range, which had me worried at first. However, apart from the crystals at 4 MHz and 8 MHz, there is no other audible spur when the VFO and BFO are boxed as described, nor is there a serious problem with tuning 11 to 12 MHz, a busy SW broadcast band.

Alignment

For the basic receiver, verify VFO operation, and adjust so that a range of just less than 11, to just over 12 MHz is generated. Connect an antenna to the input (a few metres of hook-up wire will do for now). If there is a TV set, or video recorder operating nearby, you should hear a burble about every 15 kHz across the band. Adjust the 55 pF trim capacitors at the input filter for as flat a response as possible. Depending on circuit vagaries, some compromise in response may be necessary. Counterclockwise (CCW) rotation of the RF gain pot should cause the S meter to deflect up to full-scale. Adjust the 100 ohm meter



Converter assembly.

sensitivity trim pot for full scale deflection at the CCW position of the RF gain pot, then return the RF gain pot CW to max. Set the 500 k AGC pot to maximum. Tune in a strong signal, which should cause the meter to deflect upwards. Adjust the 500 k AGC pot for what you regard as satisfactory AGC action (probably some point near maximum). The receiver should be responsive to strong and weak signals, which should sound clean, without hum, fuzziness or distortion.

Check that USB and LSB reception is possible. Crystals vary somewhat. The 7.5 μH coil for LSB is an average value found after trying several different makes of BFO crystal. However, if you find that LSB SSB signals sound too "woolly", more series inductance is required to move the BFO frequency further away from the filter band-pass. Experimentally add some five or eight turns to the coil, and check again. If LSB SSB sounds "tinny", then less inductance is required. No adjustment is available for USB, using the crystal "straight" puts it on about the right spot at the other end of the filter. However, the crystal can be pulled quite a lot higher in frequency by inserting the appropriate amount of series trim C, so keep that idea up your sleeve if required. As a final check, tune across a Morse or RTTY signal; you should get a strong note one side of the signal, then as you tune through to the other side, the note should be much weaker. Changing to the opposite sideband should reverse the strength of the notes. Also, the character of the background hiss (no signal present) should sound about the same when switched to either sideband.

Parts

I don't know about other cities, but here near Melbourne, in addition to the usual components retailers, we have three or four vendors of radio type items. Variable capacitors, trim caps, Amidon cores, NE602's and many other parts are available from Electronic Disposals (03) 723 2699, Daycom Communications (03) 543 6444, and Stewart Electronics, (03) 543 3733. Resurrection Radio (03) 529 5639 sometimes have good used variable capacitors. The Moorabbin Radio Club, Ballarat and Bendigo hamfests, and EMDRC white elephants are always good sources of parts. Two USA mail-order suppliers; Ocean State Electronics, and Antique Electronic Supply (see ads in QST) are, in my experience, reliable sources of radio components, including variable capacitors. Finally, Rod Irving Electronics sell a good cheap range of computer crystals. So there's no excuse, you can get the parts if you're keen. Remember, demand creates the supply. Warm-up the soldering iron and get cracking.

Bibliography

Magazine Articles:

1. *Modern Receiver Mixers for High Dynamic Range — DeMaw & Collins, QST Jan. '81*
2. *Simple Receivers from Complex ICs — Parrot, Ham Radio (USA) Nov. '88.*
3. *Improving Direct Conversion Receiver Design — Hamilton, Rad Comm Apr. '91.*
4. *SSB Receiver for the 80 M Band — Williams, Electronics Australia Sep. and Dec. '91.*
5. *White Rose Radio — Hey, Rad Comm Feb. '90.*
6. *Converter Tunes 4 to 18 MHz with no Bandswitch — Najork, Ham Radio (USA) May '89.*
7. *Advanced Receiver Front Ends — Maher, Electronics Australia Apr. '89.*
8. *High-Performance Direct Conversion Receivers — Campbell, QST Aug. '92.*
9. *A Receiver Construction Experience — Bennett, Prac. Wireless Feb. '93.*
10. *Recent Advances in Shortwave Receiver Design — Rohde, QST Nov. '92*
11. *A High Dynamic Range MF/HF Receiver Front End — Makhinson, QST Feb. '93.*
12. *A Hybrid Ultimate Receiver — Tech Topics, Hawker, Rad Comm Dec. '87.*
13. *Advances in HF Receivers — Tech Topics, Hawker, Rad Comm Feb. '93.*
14. *High-Performance Single-Signal DC Receivers — Campbell, QST Jan. '93.*
15. *Computarock HF Receiver, Diamond, Amateur Radio June '92.*
16. *His Eminence-The Receiver — DeMaw, QST June — July '76.*
17. *Designing & Building Simple Crystal Filters — Hayward, QST July '87.*
18. *Switchable Bandwidth Crystal Filter — Pivnichny, Ham Radio (USA) Feb. '90.*
19. *The Ladder Filter Revived — Butler, Amateur Radio Mar. '90.*
20. *Ladder Crystal Filters — Gurr, Amateur Radio, Jan. '84.*
21. *The Double Tuned Circuit: Experimenter's Tutorial — Hayward, QST Dec. '91.*
22. *World Band Radio Receiver — Pivnichney, Electronics Now, Jan. '93.*
23. *The Basics of Simple HF Receivers — DeMaw, CQ July '93.*
24. *Build It Yourself From QST — Hale, QST Apr-July '92 (serial).*
25. *How to Lay Out RF Circuits — White, Rad Comm Feb-Mar '91.*
26. *Super Linear HF Receiver Front Ends — Tech Topics Rad Comm Sep. '93.*
27. *A Two-band Superhet (80 & 40 m) — Price, Rad Comm Sep-Oct '93.*

Books (additional to ARRL, RSGB and Radio Handbooks):

1. *Communication Receivers — Rohde & Bucher, McGraw-Hill. ISBN 0070535701.*
2. *Radio Receivers and Reception — Gosling, IEE Telecommunications Series, ISBN 0863410561.*
3. *Introduction to Radiofrequency Design — Hayward, Prentice-Hall.*
4. *Solid State Design, DeMaw & Hayward, ARRL Publications.*
5. *W1FB's QRP Notebook — DeMaw, ARRL Publications.*
6. *The Art of Electronics — Horowitz and Hill, Cambridge University Press.*
7. *Practical RF Design Manual — DeMaw, Prentice Hall.*

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WIA News

New UHF World Record

A new world distance record for the 2304 MHz band was established on 11 July last between Hawaii and California, reports the 27 July issue of the *ARRL Letter.*

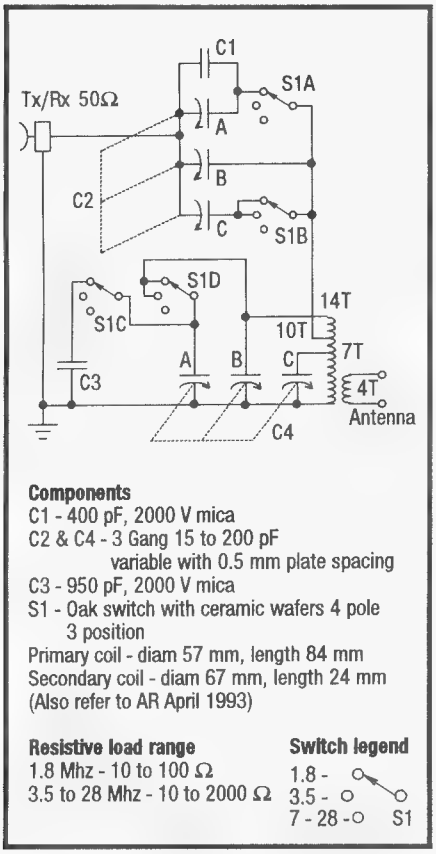
At 2321 UTC, Chip Angle N6CA at Palos Verdes in California contacted Paul Lieb KH6HME on the Mauna Loa volcano, Hawaii. The distance — 3950 km (2468.8 miles). The two operators made contact on CW, then attempted an SSB contact, but abandoned that to try making contact on 10 GHz. However, this was unsuccessful.

On 2304 MHz, both N6CA and KH6HME used homebrew transverters running 12 watts output to 1.5 metre dishes and 1.5 dB noise figure receivers. More details were to be reported in the September issue of *QST.*

Antennas

Feedback on the Design of the AR Single Coil Z Match Tuner

Lloyd Butler VK5BR with more information on the ubiquitous Z match.*



Components
C1 - 400 pF, 2000 V mica
C2 & C4 - 3 Gang 15 to 200 pF variable with 0.5 mm plate spacing
C3 - 950 pF, 2000 V mica
S1 - Oak switch with ceramic wafers 4 pole 3 position
Primary coil - diam 57 mm, length 84 mm
Secondary coil - diam 67 mm, length 24 mm
(Also refer to AR April 1993)

Resistive load range
1.8 Mhz - 10 to 100 Ω
3.5 to 28 Mhz - 10 to 2000 Ω

Switch legend
1.8 -
3.5 -
7 - 28 -
S1

Fig 1 — The VK5BR single coil Z match tuner.

Introduction

During the 1993 year, through the columns of *Random Radiators* and my own technical reports, we introduced a lot of information on the design of single coil Z match tuners. Experimentation led to one simple design which, without switching, could match a wide range of load impedances for the whole of the HF band. This article discusses some of the feedback which has been received concerning that unit and reviews some of the other forms of Z match which have been popular or have been described in *Amateur Radio.* I have also included some material showing how I arranged the single coil circuitry to make use of components I had available.

Feedback

The simple design of the Single Coil Z Match tuner seems to have captured the attention of many radio amateurs both in Australia and overseas and our AR circuit has been reprinted in several amateur radio journals in UK and USA. We have had letters and verbal feedback from numerous amateurs who have assembled the single coil Z match to the design published and who have been delighted to find how well it works on their own particular antenna system. This is encouraging feedback which adds confirmation to the performance figures I obtained at the test bench using simulated impedance loads (*Amateur Radio* — April & May 1993).

Of course one can always expect the occasional application difficulty. I know of one radio amateur who could not get his single coil unit to match the feed point of his particular G5RV antenna on 7 MHz. The G5RV is renowned for high SWR on some bands and perhaps the feedline was of such a length as to produce terminal impedance components outside the achievable range of the Z match unit. Anyway he found he could fix his particular problem by moving the input tap back up to the top of the coil.

There is also the odd critic. One night I listened, as part of an audience, to a well known radio amateur soundly condemning the single coil Z match. As far as he was concerned, the only arrangement was the two coil unit as described in the RSGB handbook. The discussion was not supported by any quoted experience using the single coil unit nor any technical data which compared the performance of single and two coil units. As presented, his argument was not really substantiated.

Operationally the two coil Z match and the single coil Z match do much the same job. Based on my bench tests, their electrical performance is similar and I am quite happy to recommend either. The single coil arrangement can be attractive to the home constructor as it is simpler, only one coil and possibly no switching if limited to the HF band (3.5 to 28 MHz). It is also interesting because it is something different for the constructor to experiment with. Goodness knows in this day and age of modern "off the shelf" amateur radio we need a few things we can still fiddle around with ourselves.

VK5BR Version

All the tests previously described in *Amateur Radio* concerning the single coil Z match were carried out on experimental assemblies prepared by a Melbourne radio amateur, unnamed in *Amateur Radio* because he requested it to be that way. I am grateful to that gentleman and Ron Fisher VK3OM of *Random Radiators* for inviting me to experiment with these units and evaluate their performance. I might not otherwise have been urged to examine the single coil idea.

Initially I was somewhat sceptical that a wide load range for the whole HF band could be achieved. I did not question the idea of the dual frequency range in the coil primary circuit as described by ZL3QQ. However, the ZL3QQ design came with secondary taps adjustable for different load conditions whereas our units had fixed secondaries. I did have doubts that the fixed secondary arrangement would satisfy a wide range of load conditions over the whole HF band. As it turned out, a coil arrangement was found which did just that and the rest is history.

I recently decided that it was high time I built a single coil Z match for my own use. As with many of my own projects, the precise design was somewhat influenced by what components I could find in my own spare parts store. The design was also influenced by exactly what I wanted it to do. I thought it might be interesting to describe how my own version of the unit evolved.

The coil was made to the precise detail as given in April/May 1993 issues of *Amateur Radio* using the perspex support sheet. I selected a pair of three gang tuning capacitors which had 0.5 mm plate spacing. At this spacing, breakdown voltage is around 2000 allowing operation at a power in the order of 400 W PEP. Each gang section measured a minimum capacity of 15 pF and a maximum capacity of 200 pF.

Referring to my curves in *Amateur Radio,* it can be seen that a maximum capacity of 200 pF is too low for 3.5 MHz and two sections of each gang must be paralleled for this band. On the other hand, the minimum capacity of two sections in parallel is 30 pF and this value is too large for the series input capacitor at 28 MHz and too large for the shunt capacitor at 7 MHz. Hence, the paralleled sections are switched in at 3.5 MHz and switched out at higher frequencies — a price I was prepared to pay for using wider spaced capacitors to achieve the higher power rating of the unit.

The unit also includes provision for operation at 1.8 MHz with load resistances between 10 and 100 ohms. I did not think I would ever have an antenna at 1.8 MHz with any higher radiation resistance than 100 ohms and provision for higher load resistance was not included. The circuit of the complete Z match unit is shown in Figure 1.

A three position Oak switch with ceramic wafers (S1) provides selection of 1.8, 3.5, or 7-28 MHz. At the higher frequencies, only single sections of the ganged capacitors are connected. At 3.5 MHz, a second section of gang is switched across the input capacitor and a second section is switched across the full winding of the coil. At 1.8 MHz, a 400 pF fixed capacitor and a third gang section are added across the input capacitor and a 950 pF fixed capacitor is added across the full winding of the coil. Fixed capacitors of at least 750 volt rating are required for the 1.8 MHz circuit and finding a source of supply of these can be a problem. I found sufficient high voltage mica capacitors in the junk box to parallel up for the required values. Rated at 2000 volts, they were more than adequate for the job.

At 1.8 MHz . . . there were no arcing problems at high power.

Bench tests on my own unit confirmed previous results of tests carried out on the units assembled in Melbourne and it worked fine with my own antennas on all bands. I did find that at 14 MHz it was sometimes necessary to operate the unit in the 3.5 MHz switch position so that two sections of the tuning gangs were in circuit. At 1.8 MHz, antenna current for a given transmitter power was only marginally less than with the L match network I normally use on this band. There were no arcing problems at high power.

My only critical comment on the assembled single coil unit concerns its physical size. Mounted in a metal box I had available, it is considerably larger than the compact coil version of the two coil Z match I had constructed a few years ago. I could have reduced the size a little by making a tailored box but, even then, the minimum size would have been limited by the fairly large single coil, space for the field around the coil and the larger wide spaced three gang variable capacitors.

The compact coil version of the two coil Z match was first introduced as the Rononymous Z match in the *Random Radiators* column of March 1990 issue of *Amateur Radio.* As you might have guessed, it was the work of our same anonymous amateur I referred to earlier. I assembled a unit using the compact coils as specified and subsequently reported on the good performance achieved in the December 1990 issue of *Amateur Radio.* Fitted in quite a small aluminium box, it takes up minimal space in the car and has been very useful to pack in with other portable gear for the field day. Perhaps there is scope for even another version of the single coil Z match, also using a compact coil arrangement.

Summary of Z Match Designs

With all the Z match designs that have been submitted, choice for one's own use can get confusing. Let's briefly comment on each design in turn:

(1) The two coil design in the *RSGB Handbook* and based on a design by Allen King W1CIL has been used with great success by radio amateurs all around the world. The tuner essentially covers bands over the range of 3.5 to 28 MHz.

(2) The compact coil version of the two coil Z match introduced in *Amateur Radio* and as discussed in a previous paragraph, covers a similar band range and has performed equally well. The smaller coil assembly enables the whole tuner to be fitted in a smaller container than needed for the RSGB type assembly.

(3) The AR Single Coil Z match was developed from a circuit design by ZL3QQ but was improved to cover a wide range of operating conditions without switching. (Refer *Random Radiators, Amateur Radio* May 1993 and VK5BR *Amateur Radio* April 1993). There is not a lot to differentiate between the electrical performance of the single coil unit and the two coil units but with coil switching removed, tuning of the single coil unit is a little simplified. Construction of the single coil unit is also simpler as the coil winding effort is halved. The basic tuners cover the range of 3.5 to 28 MHz but in my article I showed how operation of the single coil unit could be extended down to the 1.8 MHz band by the addition of a switch and a few fixed capacitors.

(4) A Single Coil Z match for 1.8 to 14 MHz was introduced in *Random Radiators, Amateur Radio* August 1993. This was made with a higher inductance coil to get down to 1.8 MHz without switching in

fixed capacitors. However, in doing this, there is a penalty of losing bands above 14 MHz. Personally I wasn't greatly impressed with this arrangement. At 1.8 and 3.5 MHz, the tuning network generally operates with a higher loaded Q than the tuner described in the previous paragraph. Higher voltages are developed imposing greater restrictions on power and load impedance range for a given tuning capacitor plate spacing. For 1.8 MHz, I prefer to use the 3.5 to 28 MHz design with added capacitor switching for 1.8 MHz if required.

(5) Z Match — Two Coil Windings but no Switching. (VK5BR *Amateur Radio* September 1993). This was a slightly different arrangement which was examined during our experimentation. The article in *Amateur Radio* was submitted as a report on experimental work carried out rather than a suggested prototype for duplication. As I was able to make it match over quite a wide load resistance range, I felt it should be documented as another workable option even if not one which we might promote.

What are the Conclusions?

Firstly, if you already have a two coil Z Match tuner and it does what you want it to do, don't throw it away. Both the RSGB type coil design and the Rononymous compact coil design have been well proven. Both units operate over the frequency range of 3.5 to 28 MHz.

However, the AR single coil Z match design is now available as a simpler option achieving much the same load impedance range at the same range of frequencies. We have also shown that its operation can be extended to the 1.8 MHz band by adding a few components.

Apart from their simplicity and their wide matching range, the Z match tuners have several other attractive features. Firstly, their matching is all achieved without the need of roller or tapped and switched inductors. Secondly, their load can be balanced or unbalanced and no additional balun transformer is required. The output circuit is ideal to interface balanced transmission lines, tuned or untuned and to match the odd random length of wire. The single coil version also has the additional feature that, provided large enough tuning capacitors are used, coil or band switching is not needed for the basic HF range.

So many times have I been asked, *Which Z match shall I build? Which is the best?* The answers are not all black and white but hopefully the preceding paragraphs will be of some help to those who ask.

18 Ottawa Avenue, Panorama SA 5041

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WIA News

Changes at Federal

The Federal Secretary, Bruce Thorne, tendered his resignation in August. It was accepted, with regret, at a meeting of the Federal Executive on Sunday 28 August. At that meeting, Donna Reilly, Manager of the Federal Office, was appointed Federal Secretary for the time being until a new candidate can be found.

The Federal Secretary's position is being advertised with a view to a new Federal Secretary being appointed, hopefully at the quarterly Extraordinary Federal Convention to be held over the weekend of 29-30th October.

Pieter Kloppenburg VK2CPK is now NSW Division Federal Councillor, in place of Roger Harrison VK2ZRH, who remains on Federal Executive as Vice President. New Alternate Federal Councillors for the NSW Division are Pixie Chapple VK2KPC and Peter Naish VK2BPN, replacing Terry Ryeland VK2UX and John Robinson VK2XY.

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■ Equipment Review

ICOM IC-2340H Dual Band FM Transceiver

Reviewed by Gil Sones VK3AUI

The ICOM IC-2340H is a compact, dual band, mobile FM transceiver offering high power output with full features in a package which is capable of being shoe-horned into a modern car. These days, in addition to the constraints of space in the dashboard area, you must look out for the possible action of airbags. This radio is small and you should be able to find a spot for it.

The microphone socket is on a lead coming out from the back panel so that you have some freedom where you attach it. The socket is one of the modular ones like an overgrown US phone socket.

A consequence of small size and high power output is the need to adequately ventilate the radio. A small fan is provided which operates for a period after the PTT is pressed. Alternatively, you can program the fan to operate continuously. Another need is to provide a power lead direct to the battery. The lead supplied is well fused and thick enough to minimise voltage drop.

Most of the front panel is taken up by a large display which shows both bands. The display also has signal strength and power output graphs plus displays of mute, memory, VFO, repeater, etc status. Around the display are 10 pushbuttons and four rotary controls.

The rotary controls for each band are mute/volume and tuning/memory selection controls. The mute and volume are concentric and could be a trifle fiddly whilst mobile. Still, there must be some compromise in the small space available.

The IC-2340H. Note the small size in relation to the handheld microphone, and the modular mic socket which is on a lead coming from the back of the transceiver.
(Photo by Ron Fisher VK3OM)

When switched on, the display goes into a self test routine which is arranged to be innovative and visually attractive, rather like some screen saver routines. This display also appears if you haven't used the controls for a period. After some time, if the display gyrations pall, you can dispense with it as this is one of the software options.

There are many software options which lead to an instruction book of 56 pages. This book is truly an operation manual with only a one page specification and no block or circuit diagram.

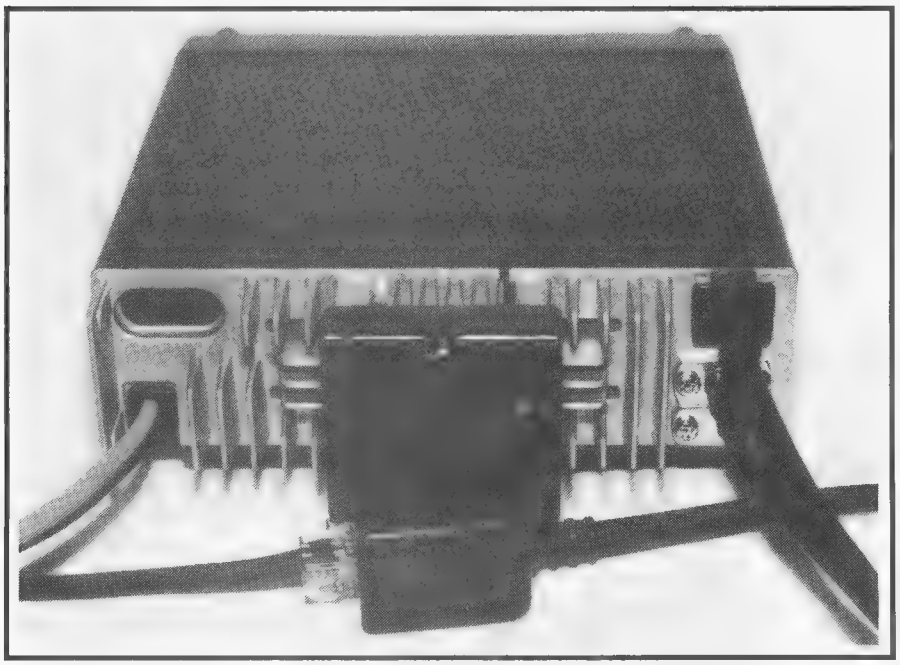
One feature you may be tempted to deactivate are the beeps which are emitted when various things happen. However, this may be unwise as they also are used to confirm various operations.

Some interesting timeouts are available. The length of transmission can be limited which is handy in the situation where you manage to drive down the road sitting on the microphone. It will also tend to limit your monologues if you are operating simplex. The timeout has several times available from 3 minutes to 30 minutes. The radio can also be set to switch off, if not used for a time between 30 minutes and 2 hours, so as not to leave you with a flat car battery if you leave it running.

Repeaters with odd offsets can be easily accommodated as the offset can be varied from the standard one. Both bands have the standard offsets programmed as the default values.

Memory capacity is 50 memories per band plus the scan edge memories. The memories can store offsets and, if required, CTCSS info. The memory medium is an EEPROM which is non volatile and does not depend on a lithium battery. Even so, when operating from a mains supply, a glitch was able to so scramble things that a major reset was needed. The glitch apparently came from builders' equipment a few doors away.

Mains power supplies need to be quite hefty if you use the radio in the shack. The transmit current drain can be around 10 amps and this is a



A rear view of the IC-2340H, again showing the modular mic socket and plug, and the programmable fan, very necessary as a consequence of the small size and high power output of the transceiver.
(Photo by Ron Fisher VK3OM)

steady drain unlike an HF sideband rig. The result is that the power supply for mains operation needs to be of the same size as that used for many HF transceivers. The recommended ICOM supply is the IC-PS30 which is rated up to 25 amps peak.

To fully utilise the radio at least some of the optional modules would be needed. These are a CTCSS encoder/decoder, a DTMF encoder/decoder and matching microphone, and the voice synthesiser unit.

Locally, the DTMF option is probably less usable although it does enable some interesting code operations.

The CTCSS, or sub audible tone, will be needed if you use one of the many repeaters using this system.

The voice synthesiser will be of interest for mobile operation or if you have trouble reading the display.

All the modules are small items which many users should have installed by the agent. The size and delicacy of the connectors is such that, unless you have the skill, you should leave it to an expert.

The transmit frequency coverage is limited to the amateur bands but the actual receive range is quite wide. The receiver performance is only guaranteed within the amateur bands. Very many other services can be heard. Indeed, at some times and in some locations, they can make their presence felt even within the amateur band. Disturbance from pagers is no worse than with other similar radios.

Disturbance from other services such as pagers is an area all manufacturers should address. It is a problem common to all makers. It is possible to do better. HF radios have had a lot of work done on them in this area and the same techniques can be extended to VHF and UHF.

The output connector is a UHF socket on a wander lead. Such a connector is totally inappropriate for such a fine transceiver. The connector should be a type N, or similar, constant impedance connector. ICOM are not alone in this but a UHF connector is really unsuitable for a VHF/UHF radio.

The ICOM IC-2340H is a well built radio which should give excellent service. It is well built and operates very smoothly.

Thanks to ICOM (Australia) Pty Ltd for the loan of the review transceiver.

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■ Operating

Scouting Ingenuity at the 1993 Jamboree On The Air

National Organiser of JOTA for 21 years until 1984, Noel Lynch VK4BNL has another story about last year's event.*

The bush pole mast under construction.

At a Scouter Leaders Training Course, held at the Queensland Branch Scouter Training Course at "Kulgun" near Samford in South East Queensland during last year's JOTA weekend, the Training Commissioner Col Martin decided to combine the trainees' pioneering skills with their interest in participation in JOTA to their mutual advantage.

The project he chose was a supporting tower for a rotatable tri-band Yagi, to be built with bush poles and involving the skills of the trainees in rope lashings. The accompanying photographs give some idea of their success on that enterprise.

The bush poles used were approximately three metres long and approximately 75 mm in diameter, lashed together with strong lashings. Three "outrigger" arms at the base provided the armstrong method of rotation. The base of the tower rotated on a heavy tractor bearing in a drum buried approximately one metre in the ground. The tower rotated remarkably easily during its use.

The equipment used during the evening participation by the trainees was a TS440S, loaned and operated by its owner Col Hinxman VK4ACH with me as the "second op". In all, approximately 30 good DX contacts were logged in the Pacific and European areas.

One contact, in particular, was definitely enjoyed by one of the trainees seeing it was with the operator in the small English town from which she had migrated.

In addition, little or no QRM was experienced from the small nearby neighbouring town of Samford where the training centre is located.

I recall a few years ago when the same Training Commissioner chose, as a similar pioneering activity during that particular JOTA weekend, the erection of a cubical quad antenna using somewhat lighter bush poles for the support of the elements. I also recall that it, too, worked very well!

15 Noeline Street, Dorrington QLD 4060

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The bush pole mast in the air ready to go.

Technical

Technical Abstracts

Gil Sones VK3AUI

Audio Filter

An audio filter can often be used to limit the noise bandwidth of a signal. It can shave off high frequency noise before the loudspeaker or sharpen up the CW bandwidth. An IF filter is the best way and DSP can give a good result, but a cheap and often satisfactory result can be achieved with an audio filter.

A neat design combining a simple LC filter with a single Integrated Circuit filter was described in *Radio Communications* for August 1994 by Paul Lovell G3YMP. This design uses a Maxim MA294 low pass filter IC which is actually a switched capacitor low pass filter. The filter cut off is determined by a Varicap allowing control by a potentiometer.

The IC should be obtainable and suitable varicaps are locally available. At the worst the IC could be obtained from suppliers in the USA or England. The use of Visa and the cost of airmail postage for small items is not prohibitive.

The filter uses a 150 mH inductor and two capacitors as either a 410 Hz or a 600 Hz filter. This is bypassed for SSB. The LC filter is then followed by the tunable low pass filter to further reduce the high frequency components. The low pass filter tuning range is from 240 Hz to 3.5 kHz.

The circuit is given in Fig 1 and a further circuit to provide for balanced inputs is given in Fig 2. The components are not critical and one of the more common audio output ICs could be substituted for IC2.

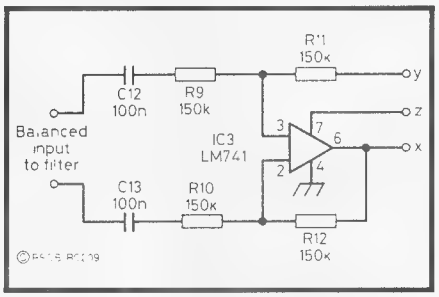

Fig 2 Balanced Input Circuit (Optional).

Coaxial Cable Wall Mounting

Coaxial cable can be a problem to fix along a wall and around 90 degree corners. The minimum bending radius allowed makes the corners very difficult to do without damaging the cable. However, a neat solution is described in *Technical Topics* in *Radio Communications* for August 1994 by Bruce Carter GW8AAG.

The solution to the problem is to use a couple of larger radius loops at the corner with the line of the corner being a tangent to both loops. Fig 3 shows how this is done. There are two solutions depending on whether the cable must be run at the same level or not.

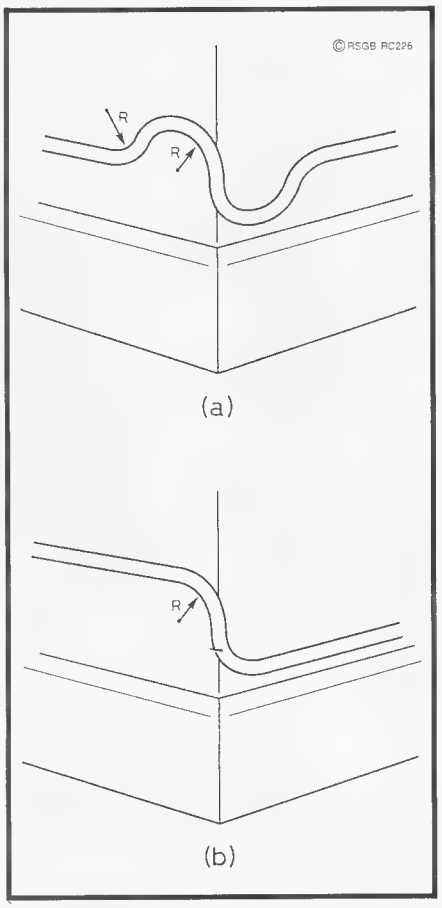

Fig 3 GW8AAG's method of overcoming the problem of taking a coaxial cable around a 90 degree corner when the cable needs to be clipped tight to the walls. (a) Where it is necessary to retain the cable run at the same level; (b) where the cable run can be at different levels. R is the permitted minimum radius for the cable in use.

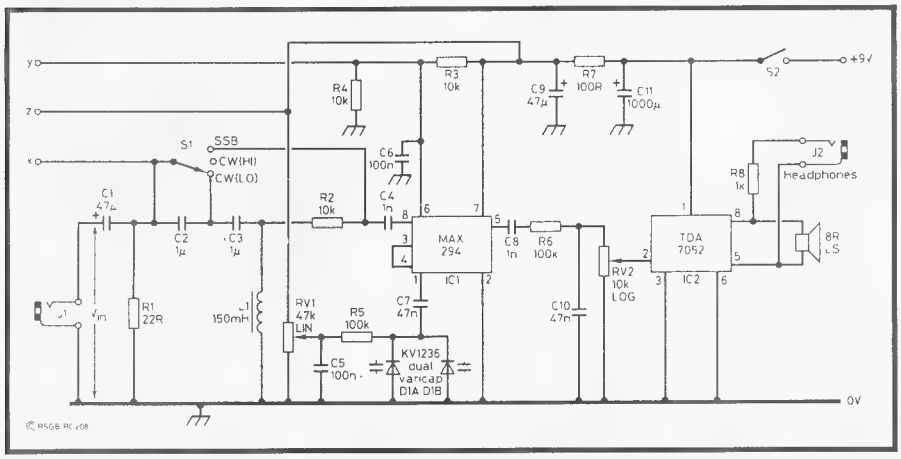

Fig 1 Audio Filter Circuit.

Simple Semiconductor Tests

Simple tests of semiconductors can be made with analogue multimeters. You can find junctions by testing for diodes but more useful tests are possible with analogue multimeters. Two such tests were featured in Pat Hawker's *Technical Topics* column in *Radio Communications* for June 1994. The item was provided originally by John Osborne G3HMO.

The first test is a breakdown voltage test of a diode. This could be either an ordinary diode or a zener diode. The only requirement for a non destructive test is that the diode can carry the deflection current of the meter in the reverse direction. For a 20 kohm per volt multimeter this is 50 microamps. A more sensitive meter will have a smaller current.

The test setup is shown in Fig 4(b). Fig 4(a) shows the reverse breakdown curve of a diode. An analogue meter of 20 kohm per volt or better on a suitable voltage range is placed in series with the diode. A variable voltage is applied measured by a second meter. This will allow the curve shown in Fig 4(c) to be plotted. As the voltage is increased the difference between the two meter readings, V3, will increase and then remain constant when the breakdown voltage of the diode is reached.

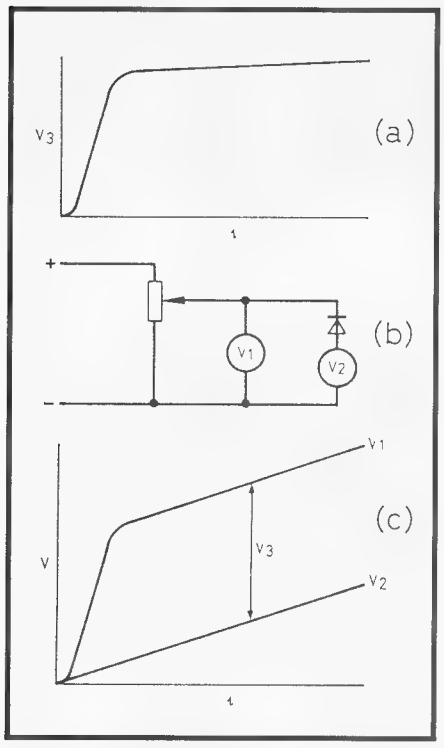

Fig 4 Use of analogue meters for non-destructive testing of the breakdown voltage of a semiconductor junction.

Transistors may be checked for action by what is known as the wet finger test. The circuit of a typical analogue multimeter is shown in Fig 5(a). The circuit shows the ohms range of the meter in series with a resistor and a battery.

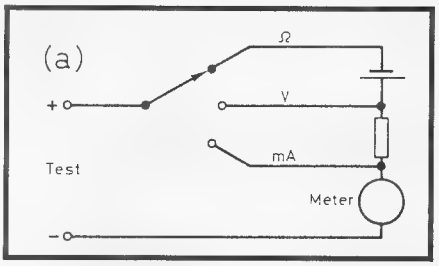

Fig 5(a) Analogue meter used to test diode breakdown voltage.

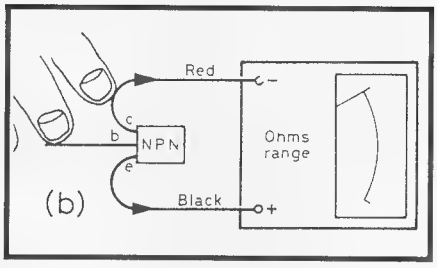

Fig 5(b) Wet finger test.

By checking for resistance between collector and emitter, with the multimeter battery acting as the transistor collector supply, a rudimentary amplifier is set up. By applying moistened fingers between base and collector some small base current will flow through your skin resistance. The collector current will increase from the small leakage current to some value which will deflect the meter.

This test is shown in Fig 4(b). With a little experimentation you can gain an idea as to whether the transistor is good or bad. A high resistance

Table 1. Annual Showers/35° South

Dates	Peak*	Shower Name	Times/Paths†	Point Ant
May 01–06	?	*Eta Aquarids*	0400–0640 NW-SE	SW
			0640–0820 E-W	S
			0820–1100 NE-SW	SE
June 17–26	June 20	*Ophiuehids*	1900–2150 N-S	W
			2150–2300 NW-SE	SW
			2300–2350 E-W	S
			2350–0100 NE-SW	SE
			0100–0350 N-S	E
July 10-August 05	July 25	*Capricornids*	2030–2240 N-S	W
			2240–0015 NW-SE	SW
			0015–0115 E-W	S
			0115–0300 NE-SW	SE
			0300–0510 N-S	E
July 15-August 20	July 30	*Pisces Australid*	2120–0115 N-S	W
			0255–0650 N-S	E
July 26–31	July 28, 30	*Delta Aquarids*	2150–0000 N-S	W
			0000–0140 NW-SE	SW
			0140–0230 E-W	S
			0230–0410 NE-SW	SE
			0410–0620 N-S	E
October 18–23	?	*Orionids*	0200–1315 NW-SE	SW
			0315–0530 E-W	S
			0530–0645 NE-SW	SE
December 05	December 05	*Phoenicids*	1420–1900 NE-SW	NW
			1900–2100 E-W	N
			2100–0140 NW-SE	NE

*Peak date may vary (see text).
†Peak hours may vary, sequence of path rotation will follow pattern shown here.

range on the meter is preferred as the current is smaller and more in keeping with the sort of base current your finger will provide. Take note that the multimeter lead polarity for this test is the reverse to what is marked on the instrument.

Meteor Scatter

An interesting series of articles on Meteor Scatter has been running in the NZART journal, *Break In*. Of particular interest is the table of meteor showers for the southern hemisphere. The articles are in the July, August and September issues of *Break In* and the author is Robert B Cooper ZL4AAA. Showers peak over a shorter period which may also vary due to a number of variables. They are annual and the year is not an even number of days in length which our calendar adjusts with leap years. Hence, there is some variability in the best times. Table 1 is of use as it gives the principal showers for the southern hemisphere.

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WIA News

New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of August 1994

L30895	MR A BURNS
L31526	MR D HARIS EFFENDI
L31527	MR J HENDERSON
L31528	MS C L TREMELLEN
L31529	MS J MCDONELL
L31530	MR C FERGUSON
L40357	MR R CAULFIELD
L50324	MR T A S FRAZER
L70120	MR J J BRADY
L70121	MR D TERAZZI
VK1JMJ	MR P M JENKINS
VK2AVE	MR J J BUSSING
VK2IAZ	MR K ARAKAWA
VK2MCD	MR J GREEN
VK2PJM	MR P J MOUTTOU
VK3JEU	MR A D TREMELLEN
VK3JWH	MR W HUNT
VK3PDL	MR P D LOCHTENBERG
VK3TLW	MR M DETERING
VK3TTC	MR A HENDY
VK3UCM	MR C MCDONELL
VK3WRE	MR W EDGAR
VK4ANH	MR E J HARRIS
VK4AZJ	MS C E HAYCOCK
VK4CMP	MR M PYE
VK4ES	MR H E SPRENGER
VK4KBQ	MR D R WATERSON
VK4KZE	MR W P ROWLAND
VK4TQX	MR H B RUSHTON
VK4VJY	MR B G WITJES
VK4ZV	MR K J GRICE
VK6AQO	MR P L HAY
VK6BWI	MR P A PARKER
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amateur radio action

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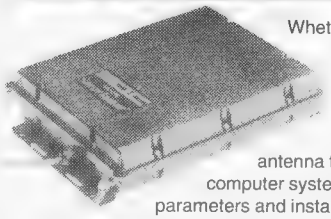

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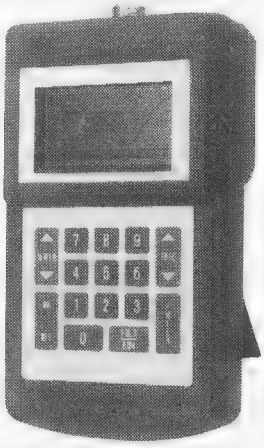

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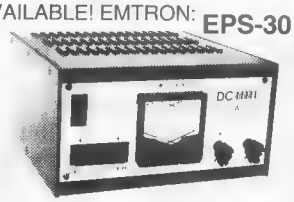

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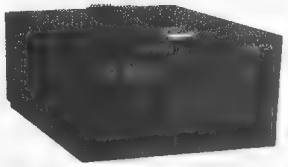

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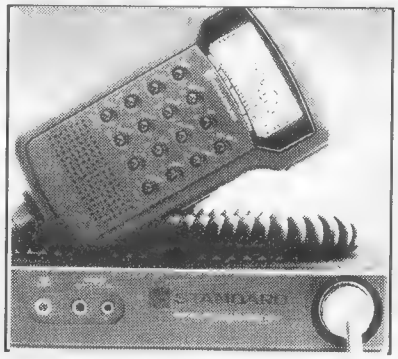

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A full featured 2-meter rig that fits anywhere, yet puts out a full 50 watts as well--that's STANDARDS NEW C1208D!
Super wide RX range, 100 memories, stores freq., offset & CTCSS tones and many other features!

JRC NEW JST-145/245
HF/HF+50MHz transceiver

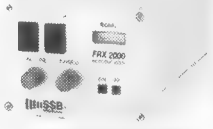
Complete with BUILD-IN SWITCHING POWER SUPPLY, AUTOMATIC ANT. TUNER, POWER MOSFET SEPPS SYSTEM and features that only a six page colour brochure can describe!

NEW from Germany!
SSB Electronic presnts

FROM SSB ELECTRONICS IN GERMANY COME THE WORLD'S BEST LOW NOISE MAST HEAD PREAMPLIFIERS! SEVERAL MODELS SUCH AS MONO-BAND, DUAL-BAND, WIDE BAND AS WELL AS DOWN-CONVERTERS FOR SATELLITE WORK ARE AVAILABLE! ***LET US KNOW YOUR NEEDS!***

DBA-270 Dual band low noise GaAs FET preamplifier with automatic RX/TX switch and 20db gain!

FRX-2000
Two channel satellite receiver for METEOSAT, with DIGISAT software!



UEK-2000 SAT Special converter for "OSKAR" sat reception. Build in LNA, noise fig. of 0.6db

SP-2000/SP-7000, Hi quality preamplifier for 2m and 70cm band. Hi gain, low noise & coax. switching!

MASTHEAD ANT. SWITCHES FOR ALL APPLICATIONS!

SP-13/SP-23
Low noise preampliffier for SHF (2.3 to 2.4 GHz & 1.25 to 1.3 GHz). Send for info!

PACKET RACKET OR RACKET IN PACKET!!

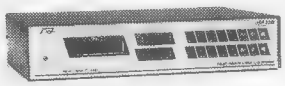
The column headed "PACKET RACKET" is aptly named! The writer presents the material in such a biased manner as to suggest, that he and his colleagues are the first and only suppliers of packet equipment. **We wish to inform you that there are TNC's made by AEA which provide multiple mode, multiple speed and multiple radio port TNC facilities to interface most transceivers, see below!**

AEA DATA CONTROLLERS

represent the most exciting value in amateur radio today.

DSP/MULTI MODE DATA CONTROLLERS. The internal software provides all popular digital amateur data modes. Unique LCD read-out on the DSP-2232 displays the mode and diagnostics for both channel.

DSP-1232 $1495 DSP-2232 $1895



PK-900: THE STEPPING STONE BETWEEN '223MBX & DSP-2232

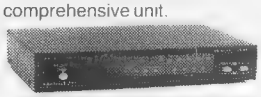
With features borrowed from the '2232', plus unique additions: dual simultaneous ports, software selectable modems, 9600 baud modem & PACTOR, etc.

$1250

PK-232MBX: MULTI-MODE DATA CONTROLLER.

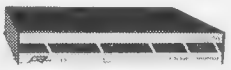
PK-232MBX, the world's leading multi-mode controller combines all amateur data communication modes in one comprehensive unit.

ONLY **$ 695**



PK88 HF/VHF PACKET TNC BEST VALUE IN PACKET RADIO!

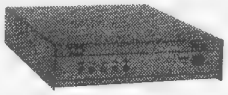
The PK-88 is loaded with unique features and backed with proven hardware and software design.



ONLY **$295**

PK96-A HIGH SPEED PACKET CONTROLLER

Tired of waiting for packet data? Wish for an easy solution? Now there is one: the PK-96, a cost-effective, high-speed, single-mode data controller.



ONLY **$499**

PC-PAKRATT FOR WINDOWS

PC-PAKRATT for Windows makes control of your AEA Data Controller easier and more enjoyable! **$250**

AEA FAX II

Tired of waiting for Weather Reports on Television. Buy AEA FAX II **$275**

NEW-NEW-NEW-NEW-NEW

ST-1 SATELLITE TRACKER to control your KENPRO 5400/5600!

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TET-EMTRON antennas are Australian designed and made of best materials available, such as marine grade stainless steel hardware and 6063T83 drawn aluminium tubing. Specially machined heavy duty boom to mast & element to boom brackets, will keep TET-EMTRON antennas on your mast FOREVER!

THREE BAND BEAMS FOR 14-21-28 MHz BANDS

TE-13 rotatable dipole **$199**
TE-23 2-element beam.....**$414**
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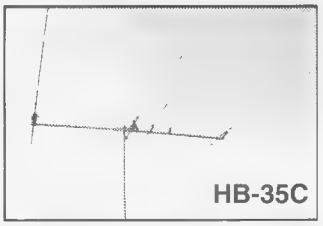
TE-33 3-element beam. **$575**
TE-43 4-element beam... ....**$750**
HB-35C 5-element trapless beam **$770**



FOUR BAND BEAMS FOR 7-14-21-28 MHz BANDS

TE-14 rotatable dipole.....**$275**
TE-34 3-ele beam on 14-21-28MHz, 1-ele on 7MHz..... ....**$695**
TE-44 4-ele beam on 14-21-28MHz, 1-ele on 7MHz. **$870**

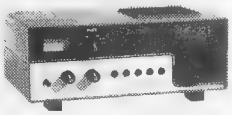
BEAT THE DX "SUN-SPOT" PROBLEM WITH THE NEW FOUR-BAND ANTENNAS

SIX BAND BEAMS FOR 10-14-18-21-25-28 MHz BANDS

TE-26 dual rotatable dipole.....**$380**
TE-46 3-ele beam on 14-21-28MHz, 1-ele on 10-18-25MHz.....**$750**
TE-56 3-ele beam on 14-21-28MHz, 2-ele on 10-18-25MHz.. .. ..**$950**

SHORTWAVE COMMUNICATION RECEIVERS

At Emtronics you can source the largest range of Short wave Radios for professional, amateur and SWL. We also supply SW receiving antennas & accessories!



HF-225 only **$1450**

LOWE ELECTRONICS presents two brilliant new receivers, with the awards:

- ***Best Portable Receiver 1989/90.** by World Radio Handbook!
- ***Most Inovative Design 1992/93.** by World Radio Handbook!
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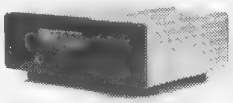
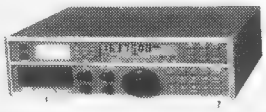
HF-150 only **$1050**



NEW AOR: AR3030

General coverage receiver with mechanical filter, DDS, and ECSS. AOR has introduced new standards in receiver design. With DDS, ECSS and Collins mechanical filters , brings the AR3030 receiver in the $4000 class



$ 1599

AOR: AR-3000A

The "TOP" of all communication receivers-scanners is the famous AR-3000A. This multi-mode radio covers a freq. range from 100KHz to 2036MHz.

$ 1950

BEST SCANNER

JRC: NRD-535G

World's best short wave receiver. Superb features include double front-end tuned circuit, optional ECSS, band pass tuning, all mode reception, memories, search, scan & sweep and modular construction.

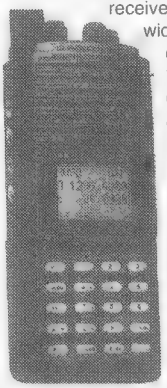
LNA-3000 is a low noise wide band preamplifier for the freq. range between 50 to 3000MHz. Ideal for improving scanner sensitivity, weather satellite, TV & radio signals, and to increase the sensitivity of test instruments!

NEW AOR AR8000

AR8000 is a new breed of radio which combines full compatibility with computer and advanced wide-band receiver technology.

A highly sensitive hand-held receiver boasting a very wide frequency coverage of 500 KHz to 1900 MHz continuous. The all-mode reception provides AM, USB, LSB, CW, NFM & WFM, with independent 4.0 KHz SSB filter as standard.

50Hz resolution!



TOO MUCH TO TELL HERE! CONTACT US

EMTRONICS

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94 Wentworth Ave
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Fax (02)281 1508

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633 Logan Rd.
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QLD 4120
Ph (07)394 2555
Fax (07)394 4316

WEST AUSTRALIA
TOWER COM.
Shop 3, 443 Albany Hwy ,VICTORIA PARK
Ph (09)470 1118
Fax (09)472 3795

VICTORIA AGENT
JOHN HILL
Ph (03)700 5428

WIA News

Singapore Conference

The 9th International Amateur Radio Union Region 3 Conference in Singapore will be over by the time members read this. Held over 5-9 September at the Apollo Hotel in Singapore's Chinatown region, five members from around the country represented Australia at the Conference.

Last February, the WIA's Federal Council voted to fund a delegation of four people to the Singapore Conference. In May, the Federal Council appointed Kevin Olds VK1OK (IARU Liaison Officer), Neil Penfold VK6NE, Gavan Berger VK1EB and John Aarsse VK4QA as the official delegation. Wally Watkins VK4DO was also accredited as an observer to the Conference as he planned to attend on his way to the 7th World ARDF Championships in Europe. At the July Federal Council meeting, Neil Penfold indicated that he would no longer be able to attend, so the Council voted unanimously to send Roger Harrison VK2ZRH, being the Vice President, in Neil's place.

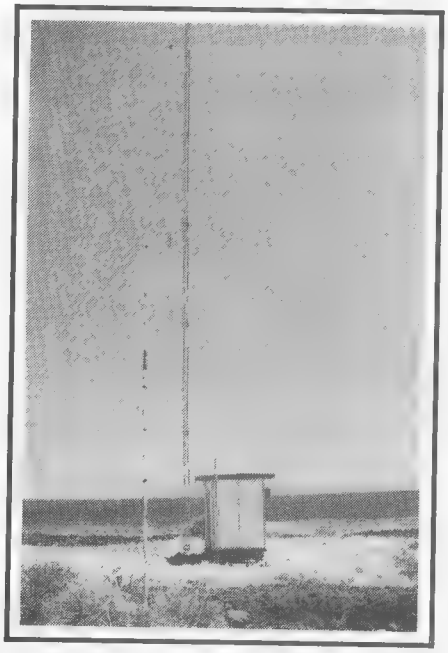
The topics of discussion at the Singapore Conference included promotion of amateur radio in developing countries, a program devised and launched at the 8th Region 3 Conference in Indonesia in 1991, matters relating to the concept of a commonly accepted amateur licence between countries, amateur satellites, amateur band intruders and misuse of amateur bands, the international HF band beacon project, amateur radio direction finding, matters relating to education of prospective amateurs and amateur examinations, and consideration of the requirement for Morse code ability for amateurs.

The outcomes of the Conference sessions will, no doubt, be reported at length in *Amateur Radio* magazine in due course.

■ Digital Communications

Setting Up VK6RWR

Bob Robinson VK6BA tells the story of a packet installation at remote Cape Lambert.*



VK6RWR, looking north, with one of the 20 metre verticals in the foreground and the VHF antennas on the mast.

It's hot in the north of WA. Summer temperatures can exceed 45 degrees Celsius but VK6RWR, the Packet Radio Station constructed, operated and maintained by the "Amateur Radio Society North West Aust Inc", continues to perform reliably at its remote site overlooking Cape Lambert, 1600 km north of Perth.

It all began as the brain child of Dave VK6YA who had for some years operated a BBS under his callsign from his home QTH in Pt Samson. All SYSOPS will be aware of the limitations imposed on their enjoyment of the hobby when equipment is committed to packet operations.

Early in June 1993, at the QTH of Steve VK6PA, interested members of the ARSNWA Inc met to decide on a plan to assemble a system capable of operating reliably at a remote site and of withstanding the high temperatures and cyclonic conditions experienced in the NW of WA.

Those present at that meeting volunteered to take on the different aspects of the project ranging from fund raising to the manufacture and assembly of the phased vertical antennas. A completion date of 30 June 1993 was set as the day for RWR to go to air from its new home. Members voted to levy the local Packet fraternity a nominal amount to establish a working bank balance with which to get the project under way. Access to a powered site had previously been obtained and now the hard work began.

The completed station, consisting of 2 HF radios and 2 VHF radios is controlled by a home built 386SX PC using DRSI cards and HF modems. One HF port operates on 20 m using FSK, connecting to VK6SR and VK6CW from a "CODAN 7727" commercial radio modified for Packet frequencies and derated in power output. The 15 m port operates on PSK connecting to stations in Indonesia and New Zealand using a Yaesu FT 107.

The HF antennas were constructed locally. On 20 m we have a pair of phased quarter wave verticals giving a cardioid pattern directed south east to Perth, Albany and Adelaide. On 15 m we opted for more gain and constructed a pair of 5/8 wave phased verticals giving a classic figure 8 bidirectional pattern giving good coverage between Indonesia, Alice Springs, Tasmania and New Zealand.

On the VHF link the reliable Philips 828s, modified to suit packet and with pin diode switching, are used to service the local TPK users on 144.850 and VK6BA on 147.600. VK6BA runs an open BBS to VK6ATS Esperance on 20 m and VK6AZL Tom Price on 40 m. All users are welcome on either VHF channel.

The culmination of all the work and the combined efforts of all concerned came to fruition on 22 Aug 1993 when VK6RWR first went to air from its new home. Although about three weeks behind schedule, it has, with very little attention, proven to be a very reliable installation. Using the popular F6FBB V5.15 software package the remote SYSOP duties are undertaken by VK6YA, PA and BA ensuring the integrity and reliability of the database at all times.

On Sunday, 10 October VK6YA, PA and AMD made the trip from Karratha and Wickham to Whim Creek repeater site to install the modified digipeater VK6RCA. As this site is solar powered the digi is CTCSS controlled to conserve battery power.

The site for VK6RCA is on a hilltop 8 km east of Whim Creek, 250 m above the surrounding countryside. It takes considerable stamina to make the trip to the top carrying radios, batteries and antennas, etc, and an early start was the order of the day. I am happy to say all OMs made it in fine style.

The antenna for RCA, designed and constructed by Richard VK6AMD, is a two element quad directed at Pt Hedland with the rear minor lobe optimised for a signal back to RWR at Cape Lambert.

Trials conducted during the day have proven this arrangement to be quite satisfactory.

Meanwhile, back at RWR, installation of the airconditioner unit proceeded along happily and all equipment is now maintained at a constant 28 degrees C.

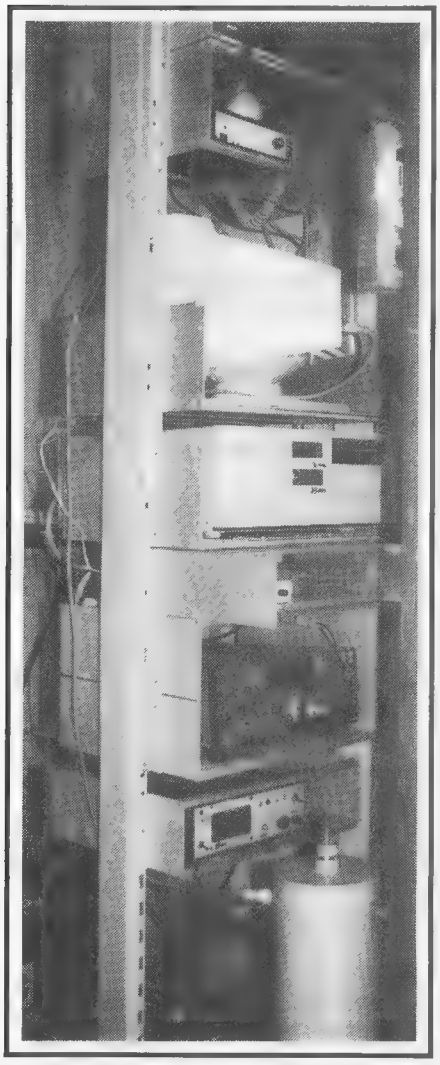
From inception in June it has taken approximately three months to complete the project and make all systems operational.

The ARSNWA Inc would like to express its appreciation to all involved with the project, especially those who have contributed so much of their time and equipment. Special thanks go to the WIA WA Division for their financial assistance, and to the Wickham Community Association, for their donation to the project.

Special thanks must also go to the following:- Richard VK6AMD, Karratha; Michael VK6BHY, Dampier; Ian VK6IH, Karratha; Dave VK6DLB, Dampier; Dave VK6YA, Pt Samson; Jim VK6CA, Perth; Malcolm VK6YDX, Wickham; Steve VK6PA, Karratha; Brian VK6AIH, Pt Hedland (digi through VK6RCA Whim Creek); and Bob VK6BA, Wickham.

ARSNWA would also like to thank those non-amateurs who have contributed their expertise in the various disciplines required to bring this undertaking to a satisfactory conclusion. We may be a small group but we get the job done.

*PO Box 20 Wickham WA 6720



The equipment rack at VK6RWR.

■ Antennas

Tuning the TH3-JR Antenna

*Alex Stuart VK2ALX**

I first sought advice concerning the tuning of my TH3-JR antenna from Hy Gain USA in about 1987. I was promptly sent a 16 page Beam Antenna Trouble Shooting Guide. I have had very recent correspondence, August/September 1993, and discussion with Telex which appears to have incorporated Hy Gain.

Trap Resonant Frequencies TH3-JR

Resonant frequencies of traps from my own GDO tests are :-

10 m Director	27.6 MHz
10 m Driven Element	26.6 MHz
10 m Reflector	27.2 MHz
15 m Driven Element	20.6 MHz
15 m Director/Reflector	20.3 MHz

These frequencies are higher by some megahertz, compared with the frequencies listed in the Hy Gain Guide. A number of amateurs have also found the trap frequencies considerably higher than the Guide figures. Telex has now advised that "the readings you took with your GDO are normal and the traps do not require adjustment" and further "we will change the guidelines to reflect accurate readings."

Physical Dimensions of the TH3-JR

Telex has advised that in regard to the beam's dimensions "the distance should be 72 inches from the outside of the boom for the reflector and director. The driven element will be more like 72 5/8 inches due to the insulator."

"The 'C' dimension should be 34 1/2 inches for phone and CW. I know

it looks odd but the overall dimensions for the driven element (excluding traps) work out to be 129.75 inches for phone and 134 inches for CW."

Comments

The long standing problem of the TH3-JR antenna trap frequencies now seems to be sorted out along with the inside or outside of the boom dimension matter previously discussed in *Amateur Radio.* Telex's proposed revision of the Guide will hopefully detail the recommended trap frequencies.

10 Wanganella Street Balgowlah Heights NSW 2093

ar

■ People in Amateur Radio

Profile of VK2GW

D Reynolds VK2ANW tells about a well known "old timer"*

Lyell Woolnough VK2GW, the son of a Professor of Geology was born at Lewisham on 10 March 1906 and, from an early age, took an active interest in radio communication.

During 1922 he accompanied his father on an expedition into Central Australia. In order to keep in touch with VIA Adelaide on 500 kHz, the army deployed a 1/2 kW spark transmitter under the control of a Lt Vic Bowen. The equipment, including generators, required two heavy vehicles for transportation.

The experience and enthusiasm gained on this trip, plus the expert tuition from Lt Bowen, enabled Lyell to obtain his licence in 1923 at the age of 17.

After schooling at Killara, Perth and Shore, he graduated in Mechanical and Electrical Engineering at Sydney University.

His first position was with the railway electrical branch until 1951 when it was taken over by the electricity commission. He was in power stations all his working life being Supt of Ultimo, Lithgow, and White Bay stations from where he retired.

Honorary positions held over the years include:-
Vice President WIA in the early 1950s, Committee member WIA, Chairman NSW branch Institute of Engineers, and Amateur Advisory Committee PMG.

All of his early equipment was home brew, but after WW2 he purchased and modified various types of military disposal sets. He won several CW awards, and at the entrance of his hallway proudly hangs a traditional Japanese painting, won in such a contest. Over the years he has kept up his technical interest, and at 87 grows a few orchids, enjoys golf when able and monitors the bands on occasions.

At the time of writing, Lyell is in RNS Hospital being treated for a recent illness. We wish him a speedy recovery.

9 Arterial Road Killara NSW 2971

ar

Help stamp out stolen equipment — always include the serial number of your equipment in your Hamad.

ALARA

*Sally Grattidge VK4SHE**

Bron VK3DYF is happy to report a successful luncheon at the QTH of Raedie, YL of Ray VK3BHL, on 31 July to celebrate the 19th birthday of ALARA in VK3. Guests included Pat VK3OZ, Robyn VK3ENX, Mavis VK3KS, Phyl VK3KYL, Jenny VK5ANW, Raedie, Gwen VK3DYL and Bron VK3DYF.

A welcome visitor from VK5 was Jenny who was in VK3 for the weekend. Robyn VK3ENX kindly offered to bring Jenny to the luncheon in her glamorous white Jaguar.

Raedie's OM was without other OM support on this occasion but he coped magnificently and kept the tea and coffee coming. The conversation ranged far and wide, from the mature age (oldies) to young ones who want to start their working life at the top of the tree. "The only job where you start at the top is digging holes" was an apt comment.

Presents were swapped, and Phyl was delighted with an African Violet. Someone (who shall be nameless) thought the VK3 Rep would not know what to do with a pair of gardening gloves. All went home quite relaxed after a very enjoyable lunch and chat, leaving Ray to do the dishes AGAIN.

First VK4 YL Meet

ALARA's first Queensland YL Meet, held in Bundaberg from 2 to 4 September 1994 was voted a success by the twenty-eight people who enjoyed each other's company over the weekend. Eleven YLs attended, ten of whom are ALARA members. The DRLs (District Radio Ladies) Robyn VK4RL (Rockhampton), Mary VK4PZ (The Caves, near Rockhampton) and Julie VK4JJB (Bundaberg) overcame the problems of distance to organize the event, ably assisted by OMs Rob VK4SEA, Gordon VK4GM and Ron VK4FC.

ALARA officials were well represented by Treasurer Margaret VK4AOE (Dalby), VK4 Rep Sally VK4SHE (Townsville) and Jnr Vice President Bev VK4NBC (Brisbane). Also present were Joycelyn VK4JJ (Bundaberg), Anne VK4ANN (Maleny), Val VK4VR (Maleny), Pat VK4PT (Brisbane) and Lorna, XYL of Ted VK4QI (Rockhampton), with OMs Guy VK4ZXZ, Rusty VK4JM, Brian VK4RX, Ervon Schwerin, David VK4DJC (Mount Morgan), Alan VK8AV (Alice Springs), Ted VK4KRR, Graham VK4BGC and Bill VK4XZ.

The Town 2 m repeater was busy on the Friday as participants arrived with cars to be directed and trains to be met. Much tea was consumed at Julie's place and bus driver for the day, Ron, saw that those without transport got where they wanted to go. A table was booked at the Bundy Tavern for the Friday night get together and an excellent meal was enjoyed by all.

Saturday was spent at the well-appointed SES Headquarters where the proceedings were officially opened by BARC president, Mike VK4ACM. Craig VK4SSB gave an informative talk on satellite operation, followed by a demonstration of computer software making it all look easy.

Lunch was an informal affair, after which most of the OMs visited the nearby workshop manufacturing Jabiru aircraft. They were able to inspect the assembly of these small planes, and watch the end product in flight.

Later, while the barbecue was being prepared, a video was shown of Wally VK4DO and Frank VK4CAU Fox Hunting in China. It proved too chilly to linger after the evening meal under the stars and soon everyone was inside again for the drawing of numerous raffles and lucky tickets. Some discussion took place regarding the next Queensland YL meet as all agreed this should be the first of many.

The YLs produced an impressive display of craft and art, Robyn's power supply and Pat's relay being the only serious home brew. This, with the ALARA mini kit and Ron and Julie's computer set-up, made the entrance to the building a popular place to meet and talk.

Sunday dawned with more perfect Queensland weather. Craig expertly handled 31 callsigns on the repeater after the news. Is this a record for Bundaberg? The group then proceeded in convoy to the Botanical Gardens for a stroll round the lake, a look inside the Bert Hinkler House Museum and morning tea. Those reluctant to grow up rode on the park railway pulled by a restored steam cane loco.

Lunch was a barbecue (yes — last night's leftovers) in Alexandra Park, with a mini zoo, cactus garden and plenty of playground equipment for the kids and VK4ANN. Bev and Graham even managed to fit in a visit to the Bundaberg Rum distillery and make it back before all the sausages were eaten. Then it was time for farewells all round.

Special mention must be made of Daniel and Skye, harmonics of VK4JJB, who enjoyed the weekend with us and were so well behaved we hardly knew they were there; also Sam, sausage dog of VK4NBC, who stole not a single hamburger nor uttered a single bark.

Congratulations to Robyn, Mary, Julie and the DRLs for making this QLD meet so successful that all present voted to make it a regular event.

Austine Henry VK3YL

I regret to report the passing of VK3YL on 9 September. See "Silent Keys" for an obituary.

mr

WIA News

Radio Sport to Take Off

Plans are afoot in the United States to sponsor a World Radiosport Team Championship in July next year, according to the 12 August issue of the *ARRL Letter*.

To be known as "WRTC-95", the event is timed to coincide with the IARU HF Championship contest held annually in July.

The Potomac Valley Radio Club (PVRC) will lead the organisation of the event. Competitors will comprise two-person teams, both members of which must live in the same ITU zone.

Applications from potential competitors, either individuals or teams, should reach the organisers by 31 December 1994. Contact Eric L. Scace K3NA, or Howard Leake W6AXX, c/- Hayman Systems, 14700 Sweitzer Lane, LAUREL, MD 20707-5905 USA.

New President for British Society

In July, the Radio Society of Great Britain (RSGB) elected Clive Trotman GW4YKL as the new President. He will take up his appointment from 1 January 1995.

Mr Trotman is the Zone E representative for Wales on the RSGB Council. The WIA has sent a letter of congratulations to Mr Trotman on his appointment.

AMSAT Australia

*Bill Magnusson VK3JT**

National co-ordinator
Graham Ratcliff VK5AGR
Packet: VK5AGR@VK5WI
AMSAT Australia net:
Control station VK5AGR
Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies (again depending on propagation conditions):
Primary 7.064 MHz. (usually during summer).

Secondary 3.685 MHz. (usually during winter).

Frequencies +/– 5 kHz for QRM.
AMSAT Australia newsletter and software service
The newsletter is published monthly by Graham VK5AGR. Subscription is $30 for Australia, $35 for New Zealand and $40 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:
AMSAT Australia
GPO Box 2141
Adelaide SA 5001

Moonbounce (EME) Tests from VE3ONT

Last month I made mention of the forthcoming EME tests taking place over the weekends of the ARRL's (American Radio Relay League) annual EME (earth-moon-earth) contest. Refer to my September AMSAT column for details of why this is an important event for satellite users. For those worthy souls who are determined to have a go, here are the details.

The Toronto VHF Society, VE3ONT, will participate in this year's ARRL EME

Contest using the Institute for Space and Terrestrial Science's 46 m (150') Algonquin Park dish (located at grid square FN05xw). If you want to enter Algonquin as a second location in your tracking program you can use FN05xw locator or, if the program only accepts latitude/longitude, you can enter latitude +45.95 degrees, longitude -78.00 degrees. Here are the times and frequencies to listen.

If you intend to call as well as listen, please note that VE3ONT will work "split" frequency. Do not call on VE3ONT's frequency. VE3ONT will use circular polarisation on all bands. You may use linear or circular polarisation to make a contact with VE3ONT. If you use circular, you would be best to use RHCP on Tx and Rx for the 144 and 432 MHz bands. On 1296 MHz they will have switchable sense so you may use either.

Low power and OSCAR class stations are encouraged to try for an EME contact with VE3ONT. 100 watts to a single long Yagi should be sufficient on the 144 and 432 MHz bands. On 1296 MHz stations were worked with as little as 10 watts and a 2 m (6') dish in 1993.

Please note that use of the dish at the Algonquin Space Complex is always subject to last minute re-scheduling for non-amateur purposes. QSLs with an SAE should be directed to Dennis Mungham VE3ASO, RR 3, Mountain, Ontario, Canada, K0E1S0.

Although the ARRL EME contest is an all weekend affair, as was the case last year, the mutual window times are small, only amounting to a couple of hours in the wee small hours of the Sunday and Monday in the eastern Australian states. On the west coast the situation is worse. They will be just about pulling the switch as the moon rises in Perth. Even in the eastern states the window only opens in the last few hours of operation on both days each weekend. The best elevation any VK station can expect will be about 22 degrees. So, it won't be easy! You will need to do your homework. Last year a number of VK stations were successful in hearing and working VE3ONT with satellite downlink gear so it can be done. As I said last month, however, the real benefit and point of this exercise is to test your receiving equipment and establish a benchmark for future improvements. Good luck, let's know of your success.

Approximate (UTC) moon rise times:

	Sydney	Adelaide	Perth
29 Oct '94	1550	1650	1815
30 Oct '94	1630	1730	1845
26 Nov '94	1430	1530	1645
27 Nov '94	1500	1600	1730

UTC Date	VE3ONT Tx Freq	Listening Range	Approx Times
29-Oct-94	432.050 MHz	432.050 — 432.060 MHz	0645 — 1815 UTC
30-Oct-94	1296.050 MHz	1296.050 — 1296.060 MHz	0754 — 1844 UTC
26-Nov-94	144.100 MHz	144.100 — 144.110 MHz	0538 — 1645 UTC
27-Nov-94	144.100 MHz	144.100 — 144.110 MHz	0646 — 1713 UTC

AO-21 Remembers

While we're on the subject of the moon, OSCAR-21 is at present carrying a goodwill commemorative message in honour of the first manned landing on the moon. Yes, it's 25 years ago that Neil Armstrong uttered those timeless words *"...one small step for man, etc"*. AO-21 operations managers have a voice recording of this historic event playing as part of the downlink cycle. The telemetry also contains a "wefax" type picture. I believe this to be in the same format as the NOAAs and METs. Has anyone managed to decode a picture? Signals are strong and can be copied on a ground plane or turnstile antenna.

Phase 3D News

I have spoken before in this column about "alligators". Inconsiderate operators who overload the satellites with far too much up link power, usually to try to compensate for inadequate receiving equipment. Various methods have been suggested to help overcome this destructive practice. It seems that education doesn't work. Nor does appealing to a sense of fair play.

"LEILA" is a device presently being tested prior to inclusion on the phase 3D

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40 M linear loaded 2 ele	$484
13-30 M logperiodic 12 ele all stainless/steel fittings	$885
70 cm beam 12 ele bal/Feed	$102
23 cm slot fed 36 ele brass cons s/solder-assembled. 18 dbd	$170
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3 ele 40m l/lcap hats 60mm boom	$785
2 m 144.190 2.2 wavelength boom	$145

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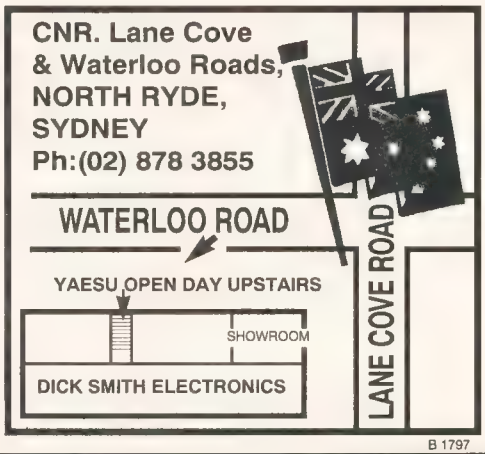


B 1797

Mobile Or Base, See Us For Trans

Yaesu FT-840 HF Transceiver

Blending the high-performance digital frequency-synthesis techniques of the FT-890 with the operating convenience of the FT-747GX which it replaces, the all new FT-840 HF mobile transceiver sets the new standard for high performance in affordable transceivers.
Covering all HF amateur bands from 160m-10m with 100w P.E.P output, and with continuous receiver coverage from 100kHz to 30MHz, the FT-840 provides SSB/CW/AM operation (FM optional), 100 memory channels, a large back-lit LCD screen, two independant VFOs per band, an effective noise blanker and an uncluttered front panel, all in a compact case size of just 238 x 93 x 243mm (WHD).
Unlike some competing models, small size doesn't mean small facilities. The FT-840 provides easily-accessible features such as: Variable mic. gain and RF power controls, SSB Speech processor for greater audio punch, and IF Shift plus CW Reverse to fight interference. Dual Direct Digital Synthesizers ensure clean transmitter output and fast Tx/Rx switching, while the low-noise receiver front-end uses an active double-balanced mixer and selectable attenuator for improved strong signal handling. The FT-840 weighs just 4.5kg and uses a thermally-switched cooling fan, surface-mount components and a metal case for cool, reliable operation.
An extensive range of accessory lines are available, including the FC-10 external automatic antenna tuner, so you can customise the FT-840 to suit your operating requirements.

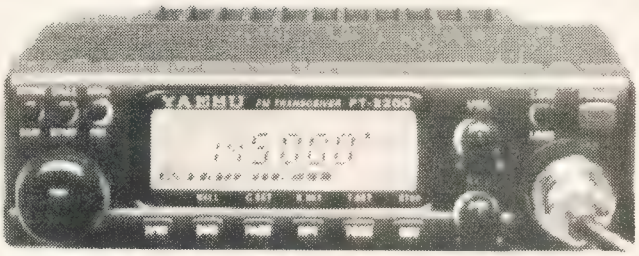
Cat D-3275

NEW FOR '94

YAESU

$1895

2 Year Warranty



NEW FOR '94

YAESU

$699

2 Year Warranty

FT-2200 2m Mobile Transceiver

The new FT-2200 is a compact, fully featured 2m FM transceiver providing selectable power output of 5, 25 and 50 watts, and includes the latest convenience features for more enjoyable mobile or base station operation. Built around a solid diecast chassis, it provides 49 tunable memories, a large variety of scanning modes, an instant recall CALL channel, 7 user-selectable channel steps from 5kHz to 50kHz and is just 140 x 40 x 160mm (not including knobs).
Backlighting of the large LCD screen, knobs and major buttons is even automatically controlled to suit ambient light conditions.
Also provided is a 38 tone CTCSS encoder, DTMF based paging and selective calling with Auto-Page/Forwarding features, and 10 DTMF auto-dial memories. The LCD screen provides a highly legible bargraph Signal/P.O. meter plus indicators for the various paging and repeater modes. An optional internal DVS-3 digital recording/playback board can also be controlled from the front panel, giving even greater messaging flexibility. Supplied with an MH-26D8 hand microphone, mobile mounting bracket and DC power lead.

Cat D-3635

FT-5200 2m/70cm Mobile Transceiver

The FT-5200 ues the latest innovations in compact cross-band full-duplex and detachable front-panel design for brilliant mobile performance. It has 32 tuneable memories, a built-in antenna duplexer, dual full-frequency LCD screen (with signal strength/power output bargraphs for each band), 8-level automatic display/button lighting dimmer and dual external speaker jacks (one for each band.) A thermally-activated fan allows up to 50 watts output on the 2-meter band and 35 on the 70cm band. Plus, scanning features include programmable scan limits, selectable scan resume modes, memory skip, priority monitoring and one-touch recall CALL channels. In addition, 6 user-selectable channel steps are provided and a FRC-4 DTMF paging selcall option lets you program a three-digit ID code so you can be paged by other transceivers, or page up to 5 other stations yourself. An optional YSK-1 remote panel lets you relocate the main rig (under the front seat, for example) and mount the control panel on the dash. The FT-5200 comes with hand-mic, mobile mounting bracket and DC power lead.

Cat D-3310

YAESU

$1499

2 Year Warranty

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- Complete with ultra long life 1000mA/H NiCad (2W RF out), carry case, belt-clip and AC charger

Cat D-3610

Only $529

2 year warranty

Hurry! Limited Stocks!

Rugged HF 5-Band Trap Vertical Antenna

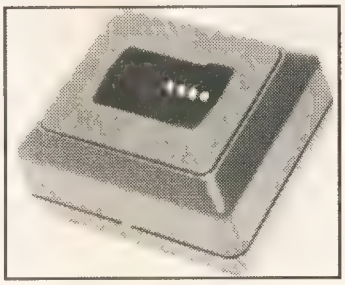
The rugged 5BTV is a 5-band HF trap vertical which continues the Hustler tradition of quality and performance. It incorporates Hustler's exclusive trap design (25mm solid fibreglass formers, high tolerance trap covers and low loss windings) for accurate trap resonance with 1 kW (PEP) power handling. Wideband coverage is provided on the 10, 15, 20 and 40m bands (SWR typically 1.15:1 at resonance, < 2:1 SWR at band edges) with 80kHz bandwidth typical on 80m at less than 2:1 SWR. An optional 30m resonator kit can also be installed without affecting operation of the other bands. High strength aluminium and a 4mm (wall thickness) extra heavy-duty base section guarantee optimum mechanical stability. At just 7.65m, the 5BTV can be ground mounted (with or without radials, although radials are recommended), or it can be mounted in an elevated position with a radial system. Unlike other antenna designs, the 5BTV can be fed with any length of 50-ohm coax cable.

Cat D-4920

HUSTLER®

$299

MasterCharger 1 Fast Desktop Charger

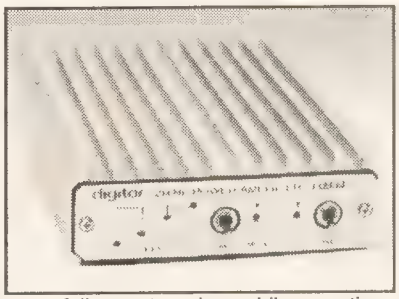


New for '94! At last, an intelligent, fast desktop charger that not only suits most current Yeasu handhelds but also many previous models. Made in USA, the MasterCharger 1 operates from 13.5V DC and uses switch-mode technology plus a Philips battery charge monitor I.C. (with -ΔV full charge detection) to correctly fast-charge NiCad batteries between 6V and 13.2V, then switch to a trickle charge. Suitable for the FT-23/73, FT-411/411e, FT-470, FT-26, FT-415/815 and FT-530, its charging cradle can easily be replaced, allowing for the insertion of a new cradle to suit earlier Yaesu transceivers (eg FT-209R) or different brands/model handhelds. The MasterCharger 1 requires 12-15V DC at 1.3A, and is supplied with a fused cigarette lighter cable for vehicle use. Cat D-3850

Now available - charging cradles to suit various Kenwood, Icom, and Alinco handhelds.

$169.95

2m RF Power Amplifier



Boost your 2m hand-held's performance with this compact amplifier. Works with 0.3 to 5W input and provides up to 30W RF output, plus has an inbuilt GaAsFet receive pre-amp providing 12dB gain. A large heatsink and metal casing allow for extended transmissions at full output, and a mobile mounting bracket is supplied for vehicle use. Requires 13.8V DC at 5A max. Size 100 x 36 x 175mm (W x H x D).

Cat D-2510

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STORES ACROSS AUSTRALIA AND NEW ZEALAND

***MAJOR AMATEUR STOCKIST STORES SHOWN IN RED**

satellite. LEILA is an anti-alligator device. It will be programmed to seek out unnecessarily strong signals. It will transmit a Morse code warning to the offender and, if the warning is unheeded (and it probably will be), LEILA will insert 18 dB of attenuation on that frequency. Other nearby signals will be unaffected. Pity it has to come to that but it seems it is the only way to get the message through to the offenders. Let's hope it works but be prepared for the flak.

You can bet the most vocal opponents of LEILA will be the very ones who are most to blame for its inclusion on the satellite. In the words of the song "They're not listening still. Perhaps they never will". LEILA can handle up to 5 offenders simultaneously.

Although phase 3D will be pushing the frontiers of amateur radio satellites into the micro-wave region, the humble HF shortwave listener has not been forgotten. An experimental 10 metre beacon transmitter called "CAM" is being designed and built in South Africa. It will transmit up to 15 minutes of digitally generated audio, mainly for educational purposes. The "Compatible Amplitude Modulation" (CAM) will allow it to be detected on simple AM shortwave receivers. Integration of the phase 3D spacecraft is proceeding at the Orlando, Florida Integration Facility.

Debris in Orbit

An interesting item appeared recently doing the rounds of the packet BBSs. It concerned a NASA study of the extent of "debris contamination" of the area of space used by low earth orbiting satellites. This is an area of concern to all satellite users including amateur radio satellite operators.

The study indicated that the area between 250 and 400 miles above the earth's surface was not as heavily contaminated by space debris as had previously been thought. The radar technique used is capable of detecting bits of debris down to the size of a pea, ie about a quarter of an inch in diameter and orbiting 400 miles out in space. Such debris has largely resulted from explosions, accidental or otherwise, aboard orbiting objects.

Several years ago much work was done on "anti-satellite" devices. Recent events have resulted in a dramatic slow down of such activities by the major players in the game. The unexpectedly low contamination of the lower earth orbit region can be directly attributed to this slowing down. The study was done as part of the lead up to the planned international space station. The 250-400 mile orbits are used by large commercial satellites and manned activities like MIR, STS and the proposed space station.

A packet of "satellite" packeteers. Having a meal before a recent packet meeting in Adelaide was, left to right, Garry VK5ZK, Graham VK5AGR, Cris ZL2TPO, Glenn VK3ZGL, Grant VK5ZWI and Tony VK5ZAI.

The news is not so good for the orbits 500-1000 miles as used by most low earth orbiting amateur radio satellites. The study indicated that this part of "inner space" was more heavily contaminated than previously thought. A probable reason for this is the rather longer life of debris in this region. Whilst lower orbit debris could be expected to re-enter in a few years, the higher orbit debris could have a lifetime of more than 1000 years. Debris can consist of spent final stage rockets and dead satellites as well as junk from deliberately or accidentally destroyed objects.

In the case of geo-stationary orbit, any junk, along with dead satellites, will, over time, collect at one of two nodal points around the equator. In this sense it will not be a problem as it is predictable and can be dealt with accordingly, even though it will stay there forever. The lower orbit junk, however, will remain a problem until it eventually re-enters the atmosphere. As such it will need to be taken into account for a long time to come, particularly in the case of manned space ventures.

*359 Williamstown Road, Yarraville VIC 3013
Packet: VK3JT@VK3BBS

AWARDS

*John Kelleher VK3DP — Federal Awards Manager**

Requests for awards keep rolling in following my suggestion that, during this quiet period of propagation, this would be an apt time to go through your QSL cards and see what you can earn.

I have had two or three letters suggesting "that my staff and I could....". That's where I stopped reading. For the information of all and sundry, I am a one man band, and cannot perform miracles, although I try!

One more request to Radio Clubs who run active awards programs. I repeat my offer to give free publicity through this column. So, Club Secretaries and/or Club Awards Managers, please let me know, at your leisure, information on the awards you sponsor.

SMIRK

From the USA, the Six Metre International Radio Klub or SMIRK, General requirements. SMIRK is a worldwide association whose purpose is to study and to promote 6 metre RF propagation. Membership information is available from the award sponsor. The fee schedule is $US1.00 for each SMIRK seal, $US3.00 for 1000 SMIRK and DXDC, and $US5.00 for a 50/100 country certificate. Overseas awards are sent by surface mail unless requested and additional postage supplied. Alaska and Hawaii are separate countries for DXDC and 50/100 Country Awards. Contacts since 1 January 1976. No crossband QSOs. GCR list and stated fee to SMIRK AWARDS, DE Abe II, 6821 West Avenue, San Antonio, Texas 78213.

Century Club Certificate. Contact 100 DX countries on 6 metres. Attach photocopies of the cards.

DX Decade Club (DXDC). Contact SMIRK members from 10 DX countries. Send photocopies of cards or GCR list. Seals

are awarded for each additional five countries.

SMIRK Seals. Awarded for contacting 100, 250 or 500 SMIRK members. List must show SMIRK member's number.

50 Country Club. Contact 50 DX countries on 6 metres. Attach photocopies of QSL cards.

1000 SMIRK Certificate. For contacting 1000 SMIRK members.

The United States of America County Award (USCA)

There are 3076 counties in the United States, and this award can provide a lifetime of enjoyment. The award is sponsored by CQ magazine. Contacts after 1 April 1983. Look for the County Hunters Net on 14336 kHz daily. The USCA is issued in seven different classes.

Class	Counties Required	States Required
USA-500	500	Any
USA-1000	1000	25
USA-1500	1500	45
USA-2000	2000	50
USA-2500	2500	50
USA-3000	3000	50

USA-3076 for ALL counties and special Honours Plaque $40.00.

The USA-CA is available to all licensed amateurs anywhere in the world and is issued to them as individuals for all county contacts made, regardless of calls held, operating QTHs, or dates.

Special USA-CAs are also available to SWLs on a heard basis. All contacts must be confirmed by QSL, and such QSLs must be in one's possession for identification by certification officials.

Any QSL card found to be altered in any way automatically disqualifies the applicant.

The scope of the USA-CA makes it mandatory that special Record Books be used for applications. These Record Books can be obtained directly from CQ Magazine, 76 N Broadway, Hicksville, NY 11801 USA for $US1.25 each. DX operators need to add extra for postage. It is recommended that two Record Books be obtained, one for application use, and the other as a personal file copy.

The fee for non-subscribers to CQ is $US10.00 or 40 IRC. Send your application to Dorothy Johnson WB9RCY, 333 South Lincoln Avenue, Mundelein, IL 60060, USA. Any further information can be obtained directly from me.

Guantanamo Bay

The Worked All Gitmo Certificate is awarded for making six contacts with KG4 operators. The application to be accompanied by copies of the QSLs. An SASE measuring 8.5 by 11 inches must be attached to the application with sufficient return postage or IRCs and sent to GARC, PSC 1005, Box 73, FPO AE 09593-0011.

British Postcodes Award

The Civil Service Amateur Radio Society in Westminster, London, England decided to mark 1990, the 150th anniversary of the issue by the British Post Office of the penny black, the world's first adhesive postage stamp, with the introduction of a new award based on working (or hearing) the various Postcode areas of the UK.

The award is for working the various UK Postcode areas on or after 6 May 1990, and is issued in 3 classes, GOLD for working all 120 postcode areas, SILVER for 100 areas, and BRONZE for 75 areas. A QSO with a CSARS HQ Callsign (G1CSR, G3CSR, GB0CSR, GX1CSR or GX3CSR) may be substituted for ONE unworked postcode area.

General awards in any class can be claimed for any combination of licensed modes and bands, whether HF or VHF and including WARC bands, and can be endorsed for single mode or single band.

QSLs are not required and should not be sent with applications. Applications should show callsign, name, full postal address, and a list of claimed QSOs showing postcode area, callsign, date, band and mode, and bearing a certification signed by the applicant and countersigned by two other licensed amateurs, that the claimed QSOs conform with the relevant entries in the applicant's log.

The award is also available to SWLs on a heard basis.

Applications, together with a fee of three pounds, or $US4.00, or 12 IRCs, should be sent to Civil Service Amateur Radio Society, Civil Service Recreation Centre, Monck Street, London SW1P 2BL, England.

**PO Box 2175 Caulfield Junction 3161*

ar

Book Review

Technical Topics Scrapbook

Author: Pat Hawker G3VA
Published by The Radio Society of Great Britain.
Reviewed by Gil Sones VK3AUI

No matter where you start it is hard to put this book down. It is full of a most interesting collection of items covering the whole range of amateur radio. The book is a collection of the "Technical Topics" column which is presented monthly in the RSGB publication *Radio Communication*.

The period covered is from 1985 to 1989. This was a very busy period in the evolution of radio and the equipment we use. There are items from the simplest to the more advanced techniques, all presented briefly in a manner which is easy to understand. Enough information is provided for you to go further if you wish.

Early radio is there together with first hand experiences of wartime clandestine equipment and operating. Much of this makes fascinating reading. It is amazing what was accomplished with what, today, is very basic equipment operated under very trying and dangerous conditions.

All manner of antenna ideas are presented and you may well find the answer to your particular problem. At the very least you should gain inspiration from other people's solutions.

The continuing evolution and development of advanced receiving and transmitting techniques unfolds with descriptions of many new developments. Some of these ideas are in today's transceivers and others will be in the rig you buy in a few years time.

Pat Hawker G3VA has a long and distinguished career and his contributions in *Radio Communication* and other publications always make interesting reading. A collection such as this is very stimulating reading. It covers a very wide range and everyone should find something of interest.

This is one of the "must have" books. It is available for $35.00 from some of the WIA Divisional Bookshops as well as from Daycom Communications Pty Ltd, who submitted the book for review. **ar**

Club Corner

Ballarat Amateur Radio Group

The following people have been elected to office to conduct the affairs of the Ballarat Amateur Radio Group for the 1994/5 year.

PRESIDENT	Bob Terrill	VK3BNC	053-361249
VICE PRESIDENT	Gordon Cornell	VK3FGC	053-392427
SECRETARY	Geoff A. Smith	VK3ADB	053-332112
TREASURER	Harry Hekkema	VK3KGL	053-357563

BARG Hamvention

Tom VK3DMK our Hamvention Coordinator has activities well in hand for the 1994 Hamvention, which will be held on the weekend of 29-30 October and promises to be the best ever held by the club. The venue will once again be the Bray Raceway. Fox hunting will commence on the Saturday afternoon, with the usual Dinner in the evening. At 9 am on Sunday the program will start in earnest with a host of attractions and ample trading tables for both new and old equipment.

For bookings or information contact Tom George VK3DMK on 053-327234. The usual great lunch, prepared by our ladies group, will be available and there will be plenty of opportunity to "nibble and natter" with your new and old mates over a cup of coffee. We look forward to seeing you there.

Jeff Muller VK3LU
Publicity Officer BARG
Tel 053 328 314

Adelaide Hills Amateur Radio Society (AHARS)

Annual Electronics Sale 1994

With various electronic components for home construction becoming harder to obtain, this is a yearly event popular with many radio amateurs. The AHARS annual electronic sale will be held on Saturday, 19 November between the hours of 9.30 am and 2.00 pm. The venue is the same as for previous years, Westbourne Park Memorial Hall, 390 Goodwood Road, Westbourne Park. The hall is about 300 metres south of the Cross Road intersection. All radio amateurs and other interested people are invited for a day of trading fun. This is the day to get rid of that surplus gear or to find the odd special component you need. It is also an excellent opportunity to have a friendly chat with other amateur radio colleagues. Pies, pasties and tea or coffee with biscuits will be available in the hall.

Those interested in selling gear must book table space and this can be arranged by ringing Geoff Taylor VK5TY on (08) 293 5616. The doors will open for trading at 9.30 am but selling vendors should present themselves at 8.30 am to prepare their tables. The club will charge a commission of 10% of gross sales with a maximum of $10 on any one item. This assists to offset the cost of hiring the hall and other expenses. All sales are by negotiation between the buyer and seller.

Test equipment and an operator will be available to carry out simple checks on components. We look forward to seeing you there.

Lloyd Butler VK5BR
Vice President AHARS

Hervey Bay Amateur Radio Club

Back in 1985 several amateurs residing in the Hervey Bay area had a vision of starting a local radio club. The inaugural meeting took place in October 1987 when the HBARC became a reality. In 1990 the club started to grow with some help from the local newspaper, which published monthly articles about the club's activities and social events with headlines such as "Amateur Radio puts Guides on Air" and "Radio Club plans Global Broadcast". It was this last headline that did the deed. The club decided to launch its "Festival of Whales Award" and everybody joined in the spirit of this great event.

The call sign VI4HBW was on the air for all those who wished to work the HBARC. QSL cards were printed, and a most impressive photograph of a Humpback Whale was used to adorn an award. Each year around August to the end of September the whales stop in Hervey Bay to nurture their young prior to the journey south to Antarctica. The whole of the area develops whale fever including the members of the HBARC who operate the station on most HF bands for a period of about a month.

The membership of the club is about 40. During a visit to Hervey Bay last year, Bernie VK4IB (I'm Bernie), Mike VK4MRB and Ritzie VK4FRZ made me feel most welcome. The club holds a Saturday meeting (informal) at the club rooms that is in the local park. It's a bit of a natter session, a "get away from the XYL, talk radio" kind of morning.

If you are travelling around our coastline in a northerly direction, call in and say Hi! to the members of the HBARC. In the past you may have heard VI4HBW or VI4FOW on air during the whale season. This year the call is VI4WWA for "White Whale Award. Give them a call and ask about the "Festival of Whales Award". Send your QSL and $5.00 to PO Box 829 Hervey Bay 4655 Qld. As propagation is generally poor this year the club will run this award until the end of October. Call VK4CHB the club station on the local repeater 146.575 MHz and arrange to meet this enthusiastic group of people.

Bob VK3UI

Liz VK4IL receiving the HBARC President's Cup, which is awarded each year to the best operator in the HBARC, from the past president Reg VK4PL.

HADARC (Hornsby and Districts Amateur Radio Club Inc)

We are inviting people who are interested in amateur radio and related fields to join our Club.

Meetings are held on the fourth Tuesday of each month at the Mt Colah Community Centre, Pierre Close, Mt Colah commencing at 8.00 pm. In addition to the monthly meeting, a workshop is held on the second Tuesday of each month (currently at the Asquith Church of Christ Hall, Wattle Street, Asquith at 8.00 pm). Visitors are most welcome.

The Club holds a "Net" each Monday evening (8.00 — 9.00 pm) on the Club's repeater, VK2RNS, on 147.250 MHz. All amateurs are welcome to join this net.

The Club conducts training classes and holds examinations for the AOCP. These classes enjoy a very good success rate for training operators for their certificate.

For further information, contact the Club Publicity Officer, Raymond Tooby (02) 489 3357 or write to the Club at, PO Box 362, Hornsby NSW 2077.

Alice Springs Amateur Radio Group

Club Project — Museum Display

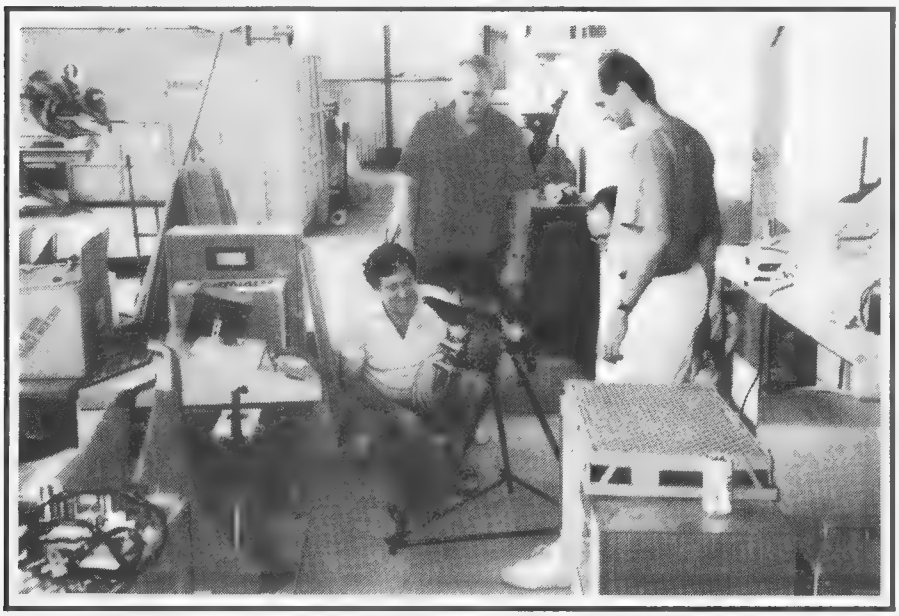
The Alice Springs Amateur Radio Club would like to welcome visitors to Alice Springs, and invite them to visit our "working" display at the Museum of Technology, Transport and Communications, on Memorial Drive. The museum has a wide variety of equipment on display, and welcomes visiting hams to be a part of it. It is open Mondays to Saturdays from 10 am till about 5 pm. Admission is FREE! The two metre repeater is on the communications tower on top of the McDonald Ranges, near Mt Gillen; the club station VK8AR is at the Museum; and the club's packet station is housed at the Velodrome, where we have our club rooms.

The club has joined the museum to set up a working display, and to work on the "ton" of equipment which the museum has acquired over the past decade or so. Saturday afternoons are usually spent cleaning and maintaining equipment which dates back to the turn of the century. Domestic and commercial receivers and transmitters, racks of power amps, pedal wireless and ex-army equipment is basically piled high, and we are slowly working our way through the shelves of what we classify as priceless gems. I think, to any club, this is an operator's dream, to be neck deep in antique radio gear! If anyone wishes to come and help, while they are holidaying, they are most welcome. Contact Jeff (VK8GF), who is the station manager, and he can give you a time and contacts. Jeff has been instrumental in liaising with the Museum, and establishing the excellent relationship that we have gained.

The station is one of the newest attractions at the museum, operating since June, 1993. Visitors from all over the world can observe an operator in action or, with an appropriate licence, use the station to make contacts. Mike VK8MR has had operators from the USA, England and Germany use the station during their stay.

People are often very surprised to see the station working, and have little knowledge of the hobby, and how diverse it can be. We have a Packet display, HF, and VHF. Future ideas for displays include satellite and slow scan imagery, and local two way communications between the Telegraph station, north of town, Adelaide house (Flynns Hospital) in the town centre, and the Old Ghan railway exhibit, 5 km south on the old rail line. This will give the visitors a chance to "pedal-wireless" their way around town without moving anywhere, and get a feel of the thrill of communications!

Contact with local operators can be made on our repeater on 146.95, but we are sometimes hard to find. Like an endangered species we have lost thirteen members to work related transfers and interstate moves, just in the past six months. Also a couple of members live hundreds of kilometres out bush. Monday nights, at eight o'clock, is the time we gather on 2 metres, to have a club net. Meetings are held at the Velodrome, on the first Monday of each month. Visitors are very welcome!



VK8GF, VK8AF, VK8KMD and VK8ZIC admiring a pedal wireless generator at the museum.

Gold Coast Amateur Radio Society Inc

Hamfest 1994

It's that time of the year for the Annual Gold Coast Hamfest. The venue for the 17th Hamfest is again the Albert Waterways Community Centre on the corner of Hooker Boulevard and Sunshine Boulevard, Mermaid Waters.

Doors will open to the public at 0900 hours on Saturday, 5 November 1994.

F W Norris VK4FN
President

Northern Corridor Radio Group

Hamfest '94

The Northern Corridor Radio Group (NCRG) will hold the 6th annual Hamfest at the Les Hansman Centre in Walter Road, Morley on 6 November at 10.00 AM.

The NCRG is hoping for an attendance of over 1,000 for Western Australia's premier hobby electronics and communications event.

The majority of Perth's hobby radio retailers will have displays along with special interest groups such as the QRP, VHF, Microwave/UHF, Digital, Repeater and ATV groups as well as the WIA Bookshop.

ICOM, Kenwood, Barrett, Codan, Tait, Terlin, Venross and Antenna West will be represented and most will have Hamfest "specials". Car boot sales will be in the car park outside the hall — they were very popular last year.

Entrance fee will be $2.00 per person including a door prize ticket. Food and drink will be on sale all day.

Contact Duncan Page on 09 240 1933 if you want a stall. Trade stalls are $20.00 each, tables can be rented at $5.00 each, and car boot stalls will cost $10.00 per car.

We look forward to seeing you all at the Les Hansman Centre, just 7 km from the centre of Perth, on 6 November for the largest gathering of friendly hobby radio enthusiasts. Talk in will be available on Channel 4 repeater (146.8 Rx/146.2 Tx) from VK6ANC for the benefit of visitors.

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When you buy something from one of our advertisers, tell them you read about it in the WIA Amateur Radio magazine.

Divisional Notes

VK6 Notes

Peter Parker VK6BWI

"There seems very little in Amateur Radio about events in VK6", I've heard some members mutter. Well, not anymore. Due to popular demand, this column has re-appeared. It's important because not everyone hears the broadcasts or attends our general meetings.

The column will be a mixture of news and information, gleaned from a number of sources. Contributions are welcome. I'm QTHR in any recent callbook.

NCRG Hamfest

Once again it's Hamfest time. The Northern Corridor Radio Group's annual Hamfest is WA's premier amateur radio event, and its attendance is compulsory for any active ham.

It will be held on Sunday, 6 November starting at 10 am. The venue will be the same as last year's, the Les Hansman Community Centre, 246 Walter Road, Morley.

It's still not too late to build something for the Homebrew Equipment Competition. Do your family a favour and clean out your shack — there are ample opportunities to dispose of unwanted components and equipment. You could rent a space in the car park for $10 per vehicle, or have your gear sold for you at the NCRG stall.

Stalls from various clubs will show you various aspects of our fascinating hobby. Take a prospective amateur along to show them what ham radio is really all about.

Commercial vendors, selling the latest in radio equipment, will also be there. Because food and drinks are available, you can stay all day.

Being at Hamfest is one way that your club or group can get the higher profile and extra members it needs. Anyone can set up a stall, and it's not too late. Contact Bill Billington VK6UE (fax/phone 409 9751) or Des Kinnersley VK6ZJ (phone 405 4215) for more information.

VK6 Divisional Broadcast

Thanks to Tony VK6TS we now have a new Divisional Broadcast Officer. Tony has a solid background in broadcasting, and has contributed to WIA broadcasts in the past. He is thus well-qualified for the job and is always seeking contributions of news from clubs and individuals to maintain the standards that we have come to expect.

Our previous broadcast officer, Glen VK6ZGT, now takes a well-earned rest. We are all grateful for the service Glen has provided, often under difficult circumstances. At the August Divisional meeting a motion of thanks was passed with applause.

JOTA

In two or three weeks Scouts and Guides worldwide will be talking to each other via amateur radio in the annual Jamboree of the Air. Both operators and equipment will be required to make this event a success. Listen to the Sunday morning Divisional Broadcast for details of how you can help.

Morse Practice Beacon VK6RCW

Those seeking to improve their Morse proficiency can now tune to 147.375 MHz for a continuous program of Morse practice texts at various speeds. A scanner or two metre FM transceiver will receive the beacon in the Perth area. It is anticipated that the beacon will eventually be shifted to a higher location to assure better coverage. Thanks are due to Joe VK6ZTN, Phil VK6SO and John VK6NT for the provision of this very useful service. Subsidised by the WA Division, this beacon is an example of what the Institute is doing for you. The beacon complements existing Morse Practice sessions on 3.555 and 146.700 MHz.

"QRM" — Tasmanian Divisional News

Robin L Harwood VK7RH

It is with deep regret that we recently heard of the death of Lou Smith VK2LS, of Port Macquarie (NSW). Lou was a keen supporter of the weekly "Tasmanian Devil Net". Only during the past year Lou was personally presented with a special award, confirming contacts with 500 separate VK7 stations, an achievement that very few native Tasmanians could rival. It will be a long time before anyone will reach that milestone. We will sadly miss Lou's check-in on the Tuesday "Devil Nets".

This month is JOTA month and, as I stated in last month's column, there will be numerous activities from various localities within the State. I did mention that the Northern Branch was hoping to operate from the Alanvale Campus of the Launceston TAFE. However, we didn't bank on the 13 element Log Periodic Beam deciding to come down in one of the infrequent winter gales we have here. It is, sadly, a complete write-off. So we will have to rely on the remaining wire antennas or even operate from existing radio amateur stations.

There is a growing interest on the Tasmanian east coast in amateur radio, judging by the increasing number of new calls springing up. I have also heard whispers of a possible WIA branch perhaps being established in the future.

In the past two months the Northern Branch have had lectures and a demonstration on the GMDSS network by Gary VK7XYZ. Last month our meeting was at the Australian Maritime College and we had a practical demonstration on what we learnt at the August meeting. Thanks Gary for the very informative lectures and demonstration.

The numbers gathering at the weekly Wednesday afternoon sessions at VK7OTC, the Domain Amateur Radio Centre, have been slowly increasing. Also, the club station is activated at 3 pm on 3.585 MHz to pick up any news for the VK7WI Sunday morning broadcast. I am also informed that a suitable QSL card for VK7OTC is being made up.

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- High gain VHF & UHF amateur, scanning & TV antennas.
- Butt section triangular aluminium towers for fixed or tilt-over applications refer (March/April 1987 *AR*).
- Selections of power chips and TX tubes at friendly prices.
- VSWR/PWR meters by Diamond to 1300MHz 10 models. All in stock.

This month also means that we will be going on to Daylight Saving Time as from 2 October. Again we are going to put the clocks forward four weeks ahead of NSW and Victoria. This will mean that Divisional broadcast on Sundays will be at 2230 UTC (Saturday) and the Tuesday repeat at 0830. The Tassie Devil Net which always follows this will be at 0900z. The Wednesday VK7NB Net will also be at 0830.

In conclusion, a reminder of the October Meetings:

Southern Branch — Wednesday, 5 October at the Domain Centre, 2000 EDT.

Northwestern Branch — Tuesday, 11 October at 1945 EDT.

Northern Branch — Wednesday, 12 October at 1930 EDT at Alanvale campus of Launceston TAFE, Block C, Level Three.

AT

WIA News

Communications Company Aids Rwanda Relief

Adelaide communications equipment manufacturer, Codan, provided a shipment of HF transceivers to help the World Food Programme's effort in the Rwandan crisis, which has been in the news these past few months.

The *Financial Review* reported early in August that staff at the South Australian factory worked overtime without charge to complete the transceivers after Codan took an urgent order from the Australian International Development Assistance Bureau (AIDAB) for 18 transceivers.

The proprietors of Codan donated 10 systems, worth about $50,000, and staff gave up their free time so that the radios could get to Africa. The Codan transceivers were developed to cope with the rigours of the Australian outback and are amongst the most advanced of their type in the world, said managing director Michael Heard.

How's DX

*Stephen Pall VK2PS**

A few days after the September issue of *Amateur Radio* arrived in the letter boxes of the readers, I received a phone call from a country amateur who asked me why I don't comment on the decline of propagation on the 20 metre amateur band? It appears that my reader is interested only in 20 metre band activity and, according to him, conditions are much worse now on that band than ten years ago at the decline phase of Cycle 21.

Trying to do the right thing, I contacted Richard Thompson, a scientist at the IPS Radio and Space Services and asked his opinion. According to Richard, the last Solar Cycle, 21, in its declining phase had a lot of flare activity. The sunspot numbers were changing up and down and, for this reason, there were more frequent openings on the bands.

The present Cycle, 22, rose very quickly to its maximum but is declining rapidly and the decline is rather uniform, without big bursts of activity, especially this year. This could be one of the reasons Richard stressed that every solar cycle is different in its behaviour and that there are many other contributing factors which affect the propagation pattern.

I asked Richard when, in his opinion, we are going to reach the bottom of this present solar cycle. He replied with caution, "We will reach the bottom of the cycle perhaps in 12 months but, most likely in 18 months. Early to mid 1996 is the likely time."

The 20 metre band, however, is not dead. Alan VK4AAR is quite active on 20 metres and, according to a list supplied by him, he had the following interesting DX contacts in the months of July and August: HP6, PJ7, 5W1, HT, YV5, A35, YN1, FT5, 5NO, T30, FK8, FW, 5Z4, FS5, KH8, EA8, and ZS2. At the other end of our continent, Dave VK6DX is also busy on 20 metres. During August he worked the following DX countries: DJ, 8J3, RA0, HL5, 7L2, VU2, 4F2, BV7, VE1, 9J2, 3D2, I2, and DL5.

I think the above short lists show that the 20 metre band is not quite dead, but one has to be on at the right time of the day to catch the "elusive" DX.

Tokyo Hamfest

If you worked 8J1HAM/1K on 20 August, you were in contact with the official radio amateur station of the Tokyo Hamfest (19 Aug-21 Aug), which attracted more than 80,000 radio amateurs from Japan and from the following countries: Korea, China, Taiwan, Philippines, Malaysia, Singapore, USA, Sweden, Finland, Germany, Switzerland, Mongolia, Grenada, New Zealand and Australia.

A modern, large, two storey building in one of the Tokyo suburbs served as the gathering point, where one could look at the most modern amateur equipment of the Japanese communication industry, or one could bargain at the upstairs flea market for various "goodies". The JARL was represented by several officials

Japan DX meeting, 1994. Left to right, standing — Ron ZL1AMO, Bill VK4CRR, Jakko OH1TZ, "Zorro" JH1AJT, Gaby XE2GV and Eric SM0AGD; sitting — Atsu VK2BEX, Ralph K0IR and Jan SM0DJZ.

including JARL president, Shozo Hara JA1AN. The ARRL DXCC desk was represented by Bill Kennamer F5FUV.

During the "Hamfest", the "Japan DX Meeting 1994", organised by "Zorro" JH1AJT, took place. This small assembly had the purpose of gathering together the participants in various DX activities of recent years. In attendance were DJ9ZB Franz, ZL1AMO Ron, Vince K5VT, Ralph K0IR, Jan SM0DJZ, Erik SM0AGD, Gaby XE2GV, Atsu VK2BEX, and Bill VK4CRR. During the meeting, slides were presented with appropriate comments on the DXpeditions to Mellish Reef VK9MM, Peter I Island 3Y0PI, Revilla Gigedo Group XF4CI, and Annabon Island 3C0GD.

Marion Island — ZS8MI

During the 12 months from April 1993 to May 1994 many VK and ZL amateurs worked Chris ZS1CDK while he was stationed as a Radio Technician on Marion Island. Chris has returned now to his home base and started the immense task of replying to the many thousands of QSL cards waiting on him.

Austin VK5WO provided some interesting information about this young operator who, without any previous HF DX experience, found himself in the middle of huge "pile-ups". Marion Island, part of the Prince Edward group of islands, was ceded by Britain to the Republic of South Africa on 29 December 1947. It is a sub-arctic, volcanic rock with an estimated age of 250,000 years. The size of the island is 490 sq km, the highest peak is 1230 m, and has an average rainfall of 2398 mm per year. Average temperature is −9 °C with a wind velocity of average 190 km/h and it snows 82 days per year. Vegetation is similar to the tundra. Therefore, Marion Island is not your ideal holiday resort.

There is no permanent population on the island but, for the past 50 years, 10 to 15 scientists go to the island annually to collect weather information and to do scientific research on flora and fauna. The only contact with the outside world is HF radio. Chris used a Grinel TR178A 100 watt transceiver and rhombic antennas. In the photo Chris is almost lost among the multitude of King Penguins at Good Hope Bay. Chris writes, *"Myself sitting between breeding King Penguins (Aptenodytes Patagonicus). Thirty per cent of the world population of King Penguins live on Marion Island. The breeding season is from mid November until March. The bird produces one white egg and the incubation period is 53 to 55 days. Both sexes brood alternatively with a fortnight period. The chick is fed for 10 to 13 months on krill, fish and squid."* If you do not want to miss out on your card from Marion Island, send your card with the appropriate return envelope and postage to Christian G De Kock, PO Box 244, Stellenbosch 7599, Republic of South Africa.

Island Hopping — VK8ISL and VK6ISL

By the time you read this, IOTA expeditioners Malcolm VK6LC and friends will have returned to their homes after a successful activity on two Australian island groups.

A detailed schedule of their planned activity arrived well after the closing time for the August issue of *Amateur Radio,* the month in which their exciting activities took place. Al, being an engineer by profession, drew up an activity schedule which resembles a precise plan for a military action. Here is a one week sample of their plan: "Mon 15 Aug — John and Mal depart Gove — travel through Arnhem Land — camp the night at Mataranka — 18 hrs — 800 km. Tue 16 Aug — arrive Borroloola on the McArthur River — prepare equipment/fuel for sea voyage to North Island—shop at supermarket. Wed 17 Aug — meet traditional landowner and sea voyage to North Island — set up DXpedition — test generator. Thu 18 Aug — set up and test radio equipment and antennas — establish accommodation and crocodile watch. Fri 19 Aug — North Island DXpedition (New OC reference 5/50) — fuel consumption test and phased verticals. Sat 20 Aug — North Island DXpedition — VK4JWG John and VK8LC Mal. Sun 21 Aug — North Island DXpedition — Callsign VK8ISL. Sir Edward Pellew Group, Gulf of Carpentaria, OC-198.

You will have noted in Mal's schedule the expression "crocodile watch". There is a story behind this sentence. North Island is a tropical, mostly sandstone covered island with lush tropical vegetation. The island is about 40 nautical miles from the mainland, a four hour trip on the open sea with a powerful motorboat. The island, part of a group of ten islands, is in the possession of the traditional owner whose prior permission to land on the island had to be obtained. The aboriginal couple, Kathie and Alan Jupiter, their married daughter and son-in-law and two small boys, live on the island, the aboriginal name of which is "Barranyi". The island's animal world consists of small wallabies, turtles, snakes and lizards. There are saltwater crocodiles on the foreshores and tiger sharks in the sea. Hence the island is a dangerous place for outsiders.

Mal and John survived partly on a mixture of western and aboriginal food. Their freshwater supply was restricted as it originated from mainland sources and was carried over to the island. Participants of the North Island expedition (17 to 22 Aug) were Mal VK8LC, aka VK6LC, stationed on the Gove Peninsula at Nhulunbuy and John VK4JWG, who travelled from Mackay, North Queensland across the top of Australia in six days over many thousands of km. An incredibly long, dusty, dry, exhausting 4-wheel drive trip on dirt roads, alone! Mal described their stay on North Island as an "interesting educational experience." Despite the breakdown of their generator they made about 2,500 contacts and the activity resulted in a new IOTA reference number, OC-198.

Leaving North Island, our expeditioners Mal and John travelled 2,815 km in 34 hours over a 72 hour time period, from Borroloola in the Northern Territory to Karratha in Western Australia across the Tanami desert which has an interesting animal life including wild horses, camels, and donkeys, with kangaroos and black cockatoos everywhere. On their way to Broome they met Jack VK6RJ and had a relaxing evening with him.

The operators on Malus Island (26 Aug-30 Aug) were Dave VK6DLB and Mal VK6LC. John VK4JWG was there but did not operate. He was the person in charge of everything else. According to Mal, without John's attention to big items like transport and antennas, or to small details like food and fuel in the generator, the expedition would not have been such a great success.

Michael VK6BHY flew out from Dampier in a helicopter to take aerial colour photographs of Malus island which is a beautiful group of three small islands interconnected by sandbars. The island is about 14 miles long and about a third of a mile wide and is 20 nautical miles from the mainland. Life on Malus island was relaxed for the expeditioners. Besides operating their transceiver there was time for some fishing and swimming in the sea without any danger around.

Transport to the island was in a boat named "Waveguide", owned and skippered by Dave VK6DLB. His assistance and participation in the activity greatly reduced the expedition marine transport costs. The Malus Island expedition lasted longer than the planned two days, to compensate for the cancellation of the third leg of the expedition to Whitmore and/or Rivoli islands. The third leg was cancelled by Mal for a simple reason — they ran out of funds.

All in all, Mal and Dave made around 2,500 QSOs from this island, which resulted in a new IOTA reference number

OC-199, known also as the Dampier Archipelago.

The equipment used was a TS-50 transceiver and an FL2100Z amplifier, a 3 kVa generator, a multiband Butternut vertical antenna, a two-phased vertical on 20 metres and a two-phased vertical on 40 metres. Propagation was fair to average. Activity was mostly during local daytime as short path propagation during the local night was non-existent to Europe. Operation on 40 metres was virtually impossible due to noise and interference. Reasonable activity was conducted with Asia, North America, Central Pacific and Europe.

Special colour QSL cards are being prepared for both expeditions. European IOTA chasers should QSL via I1HYW; all other contacts, outside Europe, direct to VK6LC, Mal Johnson, 9 Abinger Road, Lynwood, WA 6317, Australia with return envelope and return postage.

Future DX Activity

- Ken ZL2HU plans to be active from one of the North Cook Islands, Pukapuka Island, OC-098, between December 12 and January 28 as ZK1KH.
  The much heralded St Paul CY9 DXpedition, which was to take place during September by Andy N0TG and others was cancelled.
- Fred K3ZO is in Bangkok until 10 October and operates as HS0ZAR
- There will be two DXpeditions active from Ghana in the near future. The first group K5VT (9G5VT), AA7NO (9G5MB), KF7AY (9G5WH), NZ7E (9G5RM), WA7LNW (9G5TL) and WY7K (9G5MT) will be active from 26 October to 4 November, including the CQ WW SSB Contest (29-30 Oct). The contest station callsign will be 9G5TL.
- Another group of operators from the UK and US will be active from Ghana from 20 to 30 November, including the CQ WW CW Contest. The contest callsign will be 9G5NN and the QSL Manager for the contest station is Roger G3SXW. The group will be active on all CW band segments. The individual callsigns are KC7V (9G5MF), N7BG (9G5TR), K7GE (9G5JR), G3SXW (9G5RW), GM3YTS (9G5RF) and G4FAM (9G5CH). If you want to catch Ghana on CW be warned. Practise your skills — all operators are members of the FOC group.
- Kyoko 9N1KY was heard working on 14184 kHz at 1648 UTC and on 14270 kHz around 1700 UTC.
- Paul F6EXV is active from Zaire using the call 9Q5EXV for three months as from August.
- VE3MJQ is in Kigali, Rwanda from August for a period of six months and hopes to receive permission to operate with a 9X call soon. QSL to VE2PR.
- Alex PA3DZN is also in Rwanda on an order from the UN and hopes to be active soon.
- Jim WV5S and Coy N5OK will operate as V63SH and V63OH from Yap Island, OC-012 from 2 to 7 Nov.
- Yoichi JP1NWZ will be active from Antigua in the CQ WW SSB contest from 26 Oct to 3 Nov.
- 9K2ZZ will be in Kuwait until April 1995. He is active on 20, 30 and 40 metres.
- Marten LA9GY will be on Niue Island as ZK2XN from 24 Oct to 27 Nov. He will be active on all bands, favouring CW.

Interesting QSOs and QSL Information

The QSOs detailed in this section have taken place from Australia at the times indicated. To assist you further to find your DX, after indicating the month of the contact, ie August, I will indicate also the area in VK from where the contact was made. E = East Coast, W = West Coast, and M = the rest of the Continent.

- HP6AYV — Victor — 14210 — SSB — 0544 — July (E). QSL to Dr V J Warner, POB 153, Santiago, Veraguas, Panama.
- PJ7VP — David — 14222 — SSB — 0548 — July (E). QSL to D A Van Putten, Cole Bay 108, Saint Marten, Netherland Antilles.
- 9G1SB — Sewell — 14240 — SSB — 0647 — Aug (E). QSL to Sewell T Brewer, Box M 144, Accra, Ghana.
- 5Z4DU — Len — 14226 — SSB — 1335 — Aug (E). QSL to KG4X, Hugh D Corbett, PO Box 356, Winfield, AL 35594 USA.
- YN1JCC — Xavier — 14170 — SSB — 0240 — July (E). QSL to Xavier Chamorro Cardehal, PO Box 4591, Managua, Nicaragua.
- 9J2SZ — Stefan — 7005 — CW — 2138 — July (M). QSL to SP8DIP, Tadeusz Pawlasek, Ul Aleksandra Symanskiego 36 m 10, 23-200 Krasnik Lubelski, Poland.
- ZA1B — Geni — 14197 — SSB — 0446 — Aug (E). QSL to HB9BGN Albert Mueller, Im Hubacker, CH-8311, Bruetten, Switzerland.
- TR8VP — Pat — 7055 — SSB — 2100 — Aug (M). QSL to The Manager, PO Box 264, Moanda, Gabon Africa.
- FW/AA6LF — Steve — 3798 — 0726 — Aug (E). QSL to AA6BB, Gerald D Branston, 93787 Dorsey Lane, Junction City, OR 97448, USA.
- 6W6JX — Jean Louis — 7083 — SSB — 0704 — Aug (E). QSL to Jean Louis Pipien, PO Box 10, Kaolack, Senegal, Africa.
- HR2RDJ — Reg — 7085 — SSB — 0724 — Aug (E). QSL to Reginald, PO Box 273, San Pedro Sula, Republic of Honduras.
- 4T0SL — 7066 — SSB — 0732 — Aug (E). QSL to OA4ED, Augusto Morales Zevallos, A Fernandez Concha 590, El Rosedal, Miraflores, Lima, Peru.

From Here There and Everywhere

- Jeff VK3LW advises that Rene F5RRH is holding cards for QSOs with VK stations from his J28BG activity. C'mon fellows, don't you want a Djibouti card?
- A little note from Tom K0SN, QSL manager for the June 1994 St Paul Island expedition. The five Americans made 8,577 contacts in five days, including about 260 on 6 metres. Best band was 40 m followed by 20 and 30 metres. Propagation was relatively good considering the state of the solar cycle.
- Gremlins and "typos" are a constant threat to columnists. In the August issue of *Amateur Radio* we carried the news that ZB2X is a pirate. The correct news is that the callsign is held by OH2KI, but he uses it only for contest purposes. Any other time, outside contests, it is a pirate. Thanks Jim VK1FF.
- Being the writer of this column information comes to me from many sources. Back in March I received an interesting letter from Al DL1SV who sent me an SWL card dated 19 Feb 1963 from WIA-L6021. This is what Al has written. *"Enclosed you will find a QSL from an SWL in Western Australia. Although it is now more than thirty years ago when I received that card, I still remember the circumstances. At that time I lived in a flat in Braunschweig and had a 20 metre end fed antenna hanging between two houses. The Tx was 80 W out. I had never heard a VK on forty so far, to say nothing of working one, so this report did mean a lot to me. I think the person who wrote it must have been deeply interested in our hobby, for he took the trouble to dig for the really interesting stations. I have received hundreds and hundreds of SWL reports. Hardly a dozen were useful to me, but this one beat them all. So I really thought it might be worthwhile to find out whether that SWL operator stuck to ham radio, if he eventually got his licence, and maybe is still active."* This letter was a challenge to me to perform a bit of detective work for amateur radio history. It took me some time to check

every VK6 entry in the latest national callbook to find a similar name to one shown on the SWL card. I found one. It was VK6RZ. Off went a note to him. There was no immediate reply. Finally late in August a letter arrived from Peter, who acknowledged his SWL past. Writes Peter, *"Yes, I used to be WIA-L6021, from 1959 to 1979. As a listener I had nearly 300 countries confirmed plus about 160 countries on SW broadcast plus about 75 countries on medium wave. I've always been interested in LF and CW".* Who said that amateur radio is "uninteresting"? The original SWL card is now with the WIA QSL collection and DL1SV has the reply to his interesting question.

- Proposed Yemen activity of Bob N4GCK. Despite previous negative news, Bob has reached the Saudi/North Yemen border, but was detained for eight hours and all his amateur and camera equipment was confiscated. Three days later he received the equipment back but was not allowed to operate due to strict security precautions. The equipment is still in Aden.
- As from 6 July the CEPT recommendation has been accepted in Turkey.
- The latest 1A0KM operation has been approved for DXCC credit.
- An interesting surprise came in the mail the other day from Meralda VR6MW. It was the quarterly newsletter of the Pitcairn Amateur Radio Club VR6PAC. Mark VR6ME, who is the editor writes, *"Small is possibly a word that quickly comes to mind when one thinks of Pitcairn Island but, if you put the word "radio" after Pitcairn, then small becomes big". Communications are a big thing to the people of this small island".* The Pitcairn Amateur Radio Club at present has 13 members with VR6 callsigns and one member with a ZL callsign. Any licensed amateur, from anywhere, can apply for membership. The club promises to keep in touch with you about communication happenings on Pitcairn Island and to keep you generally informed. Yearly membership for international members is $US10. If you are interested, write to The Pitcairn Amateur Radio Club, PO Box 73, Pitcairn Island, South Pacific Ocean via New Zealand.
- 8J3KYO is the special station for celebrating the 1200th anniversary of Kyoto City. It will be on the air until the end of the year and will QSL every contact automatically via the Bureau. They do not need your card.

QSLs Received

TI9JJP (23 M op after third try) — TY1IJ (6 W op) — N9JCL/CY9 (4 W op) — VR6ME (6 M op) — OM3TNU (2 M op) — TU2ZR (1 M op) — 3D2ER (3 W op) — FS5PL (7 W op) — VU3VOA (17 W VU2TEC) — 9K2MU (22 W op) — H44NC (4 W op).

Thank You

Many thanks to all of you who assisted me with your contributions to this column.

Special thanks to: VK1FF, VK2BEX, VK2KCP, VK2YFU, VK3LW, VK4AAR, VK4CRR, VK5WO, VK6DX, VK6RX, VK8LC, DL1SV, K0SN, and VR6MW; and the following sources of information, *QRZ DX, The DX Bulletin, The DX News Sheet, The W6GO/K6HHD QSL Managers List* and *IPS Radio and Space Services.*

73 and Good DX.

*PO Box 93, Dural, NSW 2158

Silent Keys

Due to space demands obituaries should be no longer than 200 words.

The WIA regrets to announce the recent passing of:-

L R (Lindsay)	STEPHENS	VK2ACO
A (Al)	DAVIS-RICE	VK2AXR
H (Harry)	VAUSE	VK2HV
R G	GRAF	VK3CT
C J (Jim)	POPE	VK3DPO
R E (Ron)	RAWORTH	VK3IW
I (Ike)	TARBIT	VK3OW
J M (John)	MCCONNELL	VK3SW
M A (Austine)	HENRY	VK3YL
H W (Henry)	PERSON	VK4AAP
C L (Cecil)	RYAN	VK4CLR
R P A (Richard)	RAWSON	VK4CVT
R L	BURNS	VK5BB

Al Davis-Rice VK2AXR

Our good friend Al Davis-Rice VK2AXR passed away suddenly at a North Sydney Bus Stop on 15 June 1994, aged nearly ninety one years. Al commenced his working life in England, where he was born, upon the Canal Barges at twelve years of age. During World War 1 he worked on the docks in England, but later left to work on fishing trawlers sailing out of Hull. At the conclusion of WW1 Al studied to become a Marine Radio Officer and eventually was at sea in 1924 using spark gear.

Al upgraded his qualifications by further study and obtained his first class COCP. During WW2 he was employed installing radar gear around England and, later in the war, became a radio officer in the Merchant Navy. In 1947 he came to Australia and, after managing a number of guest houses, he joined AWA Ltd as a Marine Radio Officer. About this time he obtained his "Ham Ticket" and became a very active Ham until the end, mostly using CW.

When Al's fist became a little shaky at 87 years of age he purchased a keyer and mastered that in no time. He was to QSO a friend he had visited several times in America, Viz W3FM, the day he died. A very good Australian by adoption he was a very active man and ham, and a good cobber. We are saddened by his demise, a loss to us all in the ham fraternity.

Jim Ramage VK2HK
Harry Vause VK2HV
(himself SK soon after. Ed.)

R E (Ron) Raworth VK3IW

Ron became interested in CB some 17 years ago when, due to ill health, he was unable to continue working at the Shire of Hastings.

Having restricted mobility and failing eyesight Ron studied for his Novice Call and succeeded shortly afterwards.

During this period Ron became a Member of the SPARC and Radio Enthusiasts Club and attended both regularly while living on the Mornington Peninsula.

Ron's interest in Amateur Radio continued and resulted in a Full Call by August '84 despite poor health and loss of eyesight.

A number of local amateurs assisted Ron in various ways, in particular Frank VK3BC who made and fitted several audio read-out devices to assist Ron operate his radio equipment.

Ron and wife Viv moved to Echuca for several years and later to Talbot where Ron's tower beamed high above the old Gold Mining Town. This proved to be an excellent DX location from where many local and DX contacts were made, especially with friends in the USA.

Ron passed away at the Maryborough Hospital on 14 July 1994. He will be remembered as a quiet, friendly and concerning person.

Sympathy to Viv and family from all Ron's amateur radio friends.

Geoff Agar VK3BGT

Ike Tarbit VK3OW

Our father was born at Dewley Mill, near Newcastle on Tyne, Northumberland, UK on 2 October 1903.

He was intensely interested in wireless and photography all his life and was a

member of a wireless club in Brisbane that pre-dated the WIA. After raising a family and retiring from the PMG, he was at last able to gain his full call. His interests in photography and "wireless" were fulfilled by becoming active in ATV. He maintained a Monday to Saturday sched on 40 m for many years with VK2ZC, VK3s SW, SY, HL and, once a week, with VK4AL on 20 m. He was a member of the Old Timers Club and a regular listener to the 160 m morning "coffee break".

In the last few years, with his wife permanently in a nursing home and difficulty in caring for himself, he reluctantly entered a Special Accommodation Home at Ringwood. We were able to erect a multiband vertical on the roof of the Home. At first he used an FT-990 and, when that became too complicated for his shaky hands, an IC-730 on which his son-in-law made covers to "hide" the unnecessary push buttons. His family is sure that keeping contact with other amateurs considerably extended his life and extend their gratitude for the companionship and help the above mentioned and other amateurs gave him when operating became more difficult.

No one realised that his usual 40 m contact on Saturday, 6 August would be his last before entering hospital the next day. He died peacefully on 11 August 1994. He was almost 91 years of age.

Alan Tarbit VK4AL, Hilary Darmody and Lois Saleeba

Austine Henry VK3YL

Austine came on air on 13 May 1930 and enjoyed 64 years as an amateur radio operator. Austine's radio interest began when she was a child. When studying to obtain her licence she was coached by Will, who became her husband.

Austine was keen on the CW mode; by 1993 Austine's proficiency in CW was such that she was admitted to the Royal Australian Air Force Wireless Reserve, a group of amateurs who regularly visited Point Cook for training. Imagine the surprise of RAAF officers when a woman appeared in the group.

During the war Austine took WIA classes in Morse code training of service personnel. In 1957 she had a contact with FO8AP/MM operating on the ill-fated Tahiti Nui raft, attempting to float to Chile.

Austine was the oldest living lady amateur operator in Australia and her list of achievements included the ARRL DXCC Honour List in CW; her current position on the CW DXCC General List is third.

Austine had earned many awards and was a member of RSGB, a foundation member of YASME, an assistant director of the Old Old Timers Club, and a member of YLRL, YLISSB and RAOTC.

Austine was known worldwide and will be missed by many in the field of amateur radio, especially the ALARA members.

Bron Brown VK3DYF

Jim Pope VK3DPO

Jim passed away in his 78th year on 30 July 1994 at Heidelberg Hospital after a long illness with cancer. He enlisted in the RAAF, serving as a pilot with 30 Squadron at Morotai, flying Beauforts and Beaufighters and later as a flying instructor. Jim gained his novice licence in 1979 then followed with his full call in 1981. He served for a good number of years as a volunteer at the WIA Vic Division office until unable to do so. An active church member and elder he was responsible for setting up the Disciples Amateur Radio Fellowship in Australia, resulting in approximately 25 members in four Australian states, maintaining contact with their US and New Zealand counterparts through weekly nets.

We remember a good friend, and express our deepest sympathy to his widow, Dulcie, and members of his family.

Ted Wraight VK3ALT

Continued next page

WIA News

EMI/EMC standards

The August issue of *The Australian Standard*, the publication of Standards Australia, carried a feature article on "Cleaning up the spectrum", covering aspects of electromagnetic interference (EMI) and electromagnetic compatibility (EMC).

The article notes that in 1989, the European Community (EC) put in place an electromagnetic compatibility (EMC) regime. This has resulted in a common standard there that requires all electrical and electronic equipment sold in the European Community from 1 January 1996 onwards to meet minimum EMC requirements. Equipment meeting the requirements must bear a "ce" logo from that date. Australian companies expecting to export to Europe will be required to comply and show the logo, also.

In 1992, Standards Australia and the Spectrum Management Agency signed an agreement under which Standards Australia will develop standards to support management of the spectrum in Australia in relation to EMI and EMC matters. That year, the prevailing international EMC standards were adopted here.

Immunity standards for some specific products are under development in Australia, hearing aids in particular. This Australian initiative is a world first for, while other standards exist for hearing aids, they have not been developed specifically for immunity.

Old standards, and some only introduced two or three years ago, are being revised and updated to keep pace with the rapid developments in electrical and electronics technology, says Standards Australia.

The 1992 agreement between the SMA and Standards Australia was reconfirmed recently with the signing of a Memorandum of Understanding (MoU) between the two organisations.

Stewart Horwood, Standards Australia chief executive, and Christine Goode, spectrum manager of the SMA, signed the MoU. Under the agreement, Standards Australia will advise the SMA on which standards documents should become mandatory and the level of compliance to be required, reports the August issue of *The Australian Standard*. Christine Goode was appointed spectrum manager of the SMA in July this year after serving the past 12 months as acting spectrum manager.

W H (Bill) Thurman VK3VGY

Bill Thurman passed away suddenly and peacefully on 5 June 1994. He was 68 years of age.

Bill commenced his career as a clerk with the Department of Trade and Customs in Melbourne in 1942. During World War 2 he served as an aircraft radar mechanic in New Guinea and the Solomon Islands. In 1948 he was appointed a Cadet Engineer in the PMG's Department. At the 1956 Olympic Games in Melbourne he was responsible for Technical Liaison and planning of Communications equipment. He retired from PMG/Telecom as a Senior Engineer in 1987.

Bill, who was an active member of the Ashburton Baptist Church, enjoyed life and had a real sense of fun. He spent much of his spare time tinkering with radio and electronics and in recent years became an amateur operator. His main interest was in HF radio and he operated on 21 and 28 MHz.

John Thurman VK3JWT

Cecil Leonard Ryan VK4CLR

Cecil Leonard Ryan was almost 82 years of age when he passed away at home from a stroke. He had not enjoyed good health for some time but no one expected his passing so soon. Indeed, he had attended a meeting of his radio club only hours beforehand.

Cec served in New Guinea during the last war as a radio technician and followed in the electronic industry after his discharge.

In his retirement he turned to amateur radio and held a full call licence for some years.

His other interests included caravanning and he and his wife Val travelled extensively, including a round Australia trip.

Cec will be missed by his many radio and other friends.

George Nelson VK4WZ

Contests

*P Nesbit VK3APN — Federal Contest Coordinator**

Contest Calendar Oct-Dec 94

Oct 1/2	VK/ZL/Oceania DX Phone Contest	(Aug 94)
Oct 2	RSGB 21/28 MHz Phone Contest	(Sep 94)
Oct 8/9	VK/ZL/Oceania DX CW Contest	(Aug 94)
Oct 8/9	Iberoamericano Phone Contest	(Sep 94)
Oct 15/16	JARTS RTTY Contest	
Oct 16	RSGB 21/28 MHz CW Contest	(Sep 94)
Oct 29/30	CQ World-Wide DX Phone Contest	(Sep 94)
Nov 12/13	WAE RTTY DX Contest	(Jul 94)
Nov 12/13	OK-DX CW Contest	
Nov 12/13	ARRL International EME Competition	
Nov 19/21	All Austria CW Contest	
Nov 26/27	CQ World-Wide DX CW Contest	(Sep 94)
Dec 3/4	ARRL 160 m Contest	
Dec 10/11	ARRL 10 m Contest	
Dec 26-Jan 28	Ross Hull VHF/UHF Contest	
Dec 31	ARRL Straight Key Night	

Over the last few months, I've been making a point of searching out some of the less well known contests, run by the smaller societies. The idea of working stations in less active countries, and being able to put in a competitive log with only a handful of QSOs, seemed rather appealing. Well, I came on at the appropriate time, listened around, and called CQ TEST. And what did I hear? Nothing! I tried again... and again... and again... still nothing! So, I changed bands, and went through the process again.

After several hours of trying different bands, listening around, and calling CQ TEST, it became apparent that if anyone else was making contest QSOs, by some miraculous coincidence they kept going QRT just before I tuned my receiver onto them, or else a black hole was orbiting the earth and upsetting propagation between our respective countries. Mind you, it would have to be a *small* black hole because I could hear plenty of signals from countries *either side* of the area I was trying to work, but none from the actual area itself. Something must be wrong, I told myself, because these contests were being promoted as "world wide" ones, where "anyone can work anyone else" and "multipliers are the sum of DXCC countries" etc, etc. However, instead of the hurly burly one finds in the well known world-wide contests (CQ-WW, WPX, etc), all I could hear were the usual JAs working Ws, JAs calling CQ, and FK8s not working anybody.

Well, I did this for three contests, growing increasingly frustrated each time. Eventually, in the third contest, I did actually hear a station in the country I was trying to work. Even better, he was the official station of the relevant radio society, and was sporting a special prefix to boot! He was working stations ten to the dozen, but the odd thing was that he wasn't exchanging contest numbers, only RST and, what's more, was running 5 kHz split. This is one strange contest, I thought, but I kept calling him anyway, although without success. Twenty minutes later he QSYed to 80 m, and increased his split to 20 kHz. 20 kHz mind you!!! It's not as if he was inundated with stations, in fact he couldn't seem to hear anyone, despite being called by two or three VKs and a W.

The point is that I'm baffled why societies would go to the considerable effort of organising a DX contest, if stations from their own country don't enter, and their own official station prefers playing DX gun to supporting his or her own contest. Have you ever noticed a lack of interest in some of the smaller events, which could really be very interesting, if only there was a bit more activity? Is the problem simply that stations in the less common countries are often already DXed out, and perhaps dread the thought of receiving a mountain of QSLs after each contest from countries they've worked hundreds or maybe thousands of times?

As the editor periodically reminds me, space in these pages is not cheap. Whilst I aim to present the widest contest coverage possible, perhaps it is time to focus more on the better known contests, and somewhat less on the others. In the end, you, the readers, are the best judges of what should go in this column. If you have particular requirements for contest coverage, please let me know. All letters are appreciated, digested, and replied to (eventually).

Thanks this month to VK2SRM, VK3KWA, VK6APK, *CQ* and *Radio Communications*. Until next month, good contesting!

73,
Peter VK3APN

Contest Details

The following contest details are supplemented by the "General Rules & Definitions" published in April 1993 *Amateur Radio*.

3rd JARTS RTTY Contest

October 15/16, 0000z Sat to 2400z Sun

This contest is sponsored by the Japanese Amateur Radio Teleprinter Society, and is open to amateurs worldwide on 80-10 m. Categories are single operator all band, multioperator single Tx, and SWL. Use 3520-25, 7025-40, 14070-112, 21070-125, 28070-150. Exchange RST and operator age (00 for YLs; 99 for multiops). Score 2 points for each QSO in own continent (as per WAC boundary), and 3 points outside own continent. Multipliers are the total DXCC countries, plus JA/VK/W/VE call areas worked, per band. You can work your own country or call area for a multiplier. Final score equals total QSO points x multiplier. Send logs postmarked by 31 Dec to: "JARTS Contest Manager, Hiroshi Aihara JH1BIH, 1-29 Honcho, 4 Shiki, Saitama, 353 Japan".

OK-DX CW Contest

November 12/13, 1200z Sat to 1200z Sun

This CW contest occurs in the second full weekend in November each year. Bands 160-10 m. Categories are: Single operator, single and multiband; multioperator, single and multi Tx; QRP, single and multiband (max 5 W out); and SWL. Single operator stations operate max 20 hours, with min 1 hour rest periods. Multiband stations apply "10 minute band change rule" (multi Tx stations are exempt from this rule).

Send RST plus serial; OK stations will send RST plus 3 letter district code. DX (VK) stations score 10 points per OK/OL/OM QSO, and 1 point per QSO with another country. Multipliers are the sum of DXCC countries and OK districts on each band; final score is QSO points (all bands) times multiplier from all bands.

Note rest periods in the log, and use a separate log for each band. Cross-check sheets are required for 200+ QSOs. Logs can also be submitted in ASCII on DOS disk. Entries should be postmarked by 14 December, and sent to: "CSRK, Box 69, 113 27 Praha 1, Czech Republic".

1993 RD CONTEST: STATE WINNERS

Further to the results published last December, please note the state winners listed below, each of whom has been awarded a certificate.

For the sake of completeness, the list also includes the national and novice winners (indicated by * and # respectively), as shown in the December results. There are no additional overseas winners.

Congratulations are extended to all!

HF Phone:

VK1HK	207
VK2ARJ	598
VK3YH	417
VK4DDJ	343
VK5AYD	512
VK5NYD#	176
VI6CKB*	632
VK7PC	486
VK8AN	270

HF CW:

VK1FF	82
VK2ZC	105
VK3DVW	92
VK3NAH#	30
VK4XA*	134
VK5AGX	97
VK6AFW	94
VK7RY	50
VK8HA	70

VHF Phone:

VK1DO	272
VK2ANK	62
VK3ACR*	864
VK5TTY#	494
VK6YS	563
VK7GL	26

VHF CW:

VK1DO*	13

VHF Digital:

VK1ZX	6
VK3KKS	13
VK6KS*	50
VK6XPS#	42

Results of 1994 WIA Novice Contest

Presented by Ray, VK2SRM

There were 50 entries in this year's contest, comprising 38 in Section A (Phone), and 12 in Section B (CW). No entries were received for Section C (SWL).

The Keith Howard VK2AKX Trophy went to VK2LEE, the novice with the highest score in Section A (Phone), and the Clive Burns Memorial Trophy to VK2VZB, the novice with the highest score in Section B (CW). These perpetual trophies are held on permanent display at the Federal Office, and in each case the winner receives an inscribed wall plaque.

Participation was much better than last year, and the comments I received on some of the logs were very pleasing. Thanks to all who entered logs, and I hope to hear from you again next year.

Have you advised the WIA Federal Office of your new callsign? Use the form on the reverse of the Amateur Radio Address Flysheet.

National Winners:

Section A Novice:	VK2LEE
Section A AOCP:	VK4BB
Section B Novice:	VK2VZB
Section B AOCP:	VK1FF

Individual Results, Section A (Phone):

= National winners
** = Highest novice score for each state (excluding national winners)
* = Special awards
Bold = Trophy winners

VK2LEE#	932
VK4BB#	919
VK5KDX**	808
VK2NPH**	803
VK3JWZ**	732
VK3NCP*	678
VK5PSG*	671
VK7SHV*	659
VK1MOJ**	650
VK2JBW*	544
VK5MAP*	515
VK7MGS**	445
VK2ZL	436
VK7MSM	310
VK3JJM	305
VK1KLB	264
VK2MNA	236
VK4LW	226
VK4MIM**	219
VK3MGK	218
VK4OD	201
VK2BPC	160
VK2EZB	157
VK6MIN**	154
VK2WO	149
VK2FUN	142
VK2SPT	135
VK3LBA	117
VK2EII	113
VK3CAM	112
VK2PAO	110
VK2CW	90
VK2OS	90
VK3DYF	75
VK2LIB	59
VK2FJW	32
VK2VZB	32
VK1FF	10

Individual Results, Section B (CW):

VK1FF#	132
VK3EFO*	109
VK2VZB#	77
VK2SPS*	74
VK3XB*	66
VK2FJW	36
VK2AZR	35
VK4OD	26
VK2CW	13
VK7MSM	6
VK3KS	4
VK3MGK	4

*PO Box 2175, Caulfield Junction, VIC 3161

Education Notes

Brenda M Edmonds VK3KT Federal Education Coordinator*

Thank you to all those who have shown interest in, or made contributions to, the revision of the examination syllabuses. A number of useful comments were received on the draft AOCP/AOLCP syllabus. These have been considered by the committee. The draft Novice syllabus has now also been distributed to Divisions and some individuals, and some feedback has been received.

The next stage now is the circulation of drafts of the question banks. They will be going out to Divisions a section at a time. I am leaving it to the Divisions to pass each section to either the Divisional Education Officer or to some other suitable person. I am sure that each Division can find someone who has experience both in running classes and in producing multi-choice questions. The draft question bank will not be distributed as widely as the draft syllabuses and I am asking that the original document be returned with the comments, as the committee prefers not to have a variety of unofficial copies of the questions released. When the banks are finalised, it is intended that they will be made available to both class lecturers and students.

The draft syllabuses have been submitted to the SMA to indicate progress. When our work on them is considered complete, we will negotiate with the SMA until an agreement is reached. I do not expect that there will be very much change required.

The SMA is anxious to have the syllabuses completed as soon as possible, as work has already begun on arrangements for the Australian licence to be accepted by the European Conference of Postal and Telecommunication Administrations (CEPT) as equivalent to the recently finalised European Common licence. Once this agreement is completed, possession of an Australian licence will enable a licensee to operate portable/mobile in any participating country without having to apply for a permit. New Zealand completed such an agreement last year.

A further proposal, which will affect amateurs wishing to operate in other countries for longer periods, is for a Harmonised Amateur Radio Examination Certificate. The CEPT has established a list of criteria as a standard for comparison for the various national amateur radio examinations of CEPT member countries or non-CEPT member countries wishing to participate in the scheme. A sample syllabus has been published. The WIA has no intention of re-organising our syllabuses for complete agreement, but this proposal has been kept in mind during our revisions. In this way, the review of the syllabuses has served two purposes.

I will keep readers informed of the Committee's progress.

**PO Box 445, Blackburn, VIC 3130*

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Over to You — Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

RD Operating Practices

Although I'm not that keen on contesting I do have a go in the Remembrance Day contest. My participation this year (in the VHF section) was primarily to beta test my RD logging program that I started writing a few nights beforehand. Now that the contest is over and my summary sheet has been mailed off, I have come to the following conclusions;

(a) A logging program is a great help (despite having to edit the program during the contest to fix a few bugs)! Gone was the mad panic of looking through several sheets of paper to avoid working a dupe. Pen and paper was only needed to take down the details when contestants running multiple callsigns gave out all their details in one over. How about finishing one contact before starting the next?

(b) For re-working after two hours, it's amazing how many people key up and ask "are we eligible to work again?"; or, worse still, key up and then decide to rustle through their logs whilst grunting into the mic. Use your brain, minimise QRM, checking your log before calling.

(c) Many stations, some high scoring, clearly ignore the rules. Referring to *Amateur Radio,* July 1994, page 34; Rule 9: "For a contact to be valid, numbers must be exchanged between the stations making the contact. The number will comprise RS (for phone) or RST (for CW), followed by 3 figures commencing at 001 for the first contact, and incrementing by 1 for each successive contact."
Did any stations omit the RS part? Their logs are technically invalid. Whether you agree with the token "59" or not is irrelevant. The rules exist so that all participants are on a level playing field. How is rule 18 enforced in all Divisions? No one will complain about Joe Blow down the road, thereby robbing their own state of valuable points. Are the rules of token value and essentially unenforceable? The integrity of operators is questionable, particularly when they sign a declaration contrary to their on-air behaviour.

(d) Staying up past 3 am wasn't really worth the effort. The average QSO rate deteriorated to seven QSOs per hour per band.

(e) Many stations continually talk over the top of each other. If a particular channel is very congested try moving +– 25 kHz to one of the in between channels, ie spread it out a bit. This was a quiet haven for making many QSOs.

Having said that, I'll see you in the contest next year!

Adam Maurer VK3ALM
1 Jeffrey Street
Dandenong North VIC 3175

From Brazil to VK3TL

Last Sunday I saw in the home of PS7KM, the *Amateur Radio* magazine for May 1994 and, on page 41, Fire Fighting and Amateur Radio.

I enclose for the WIA Collection, QSL cards for the Annual Fire Prevention Week in Brazil. (The first week of July — the Brazilian Fireman Day is 2 July). Since 1980 I have activated Special Calls to commemorate the event (ZV2ADV, ZW8ADV and now ZW7AB).

I am a Captain (retired) of Brasilia (DF) Fire Department.

73 and congratulations for the WIA Collection.

Ronaldo Bastos Reis (PS7AB)
Caixa Postal 2021
59094-970 Natal, RN, Brasil

Request for *Amateur Radio* Help

Several VK amateurs have suggested that I ask your assistance to trace a ham friend who has changed address. I've been looking for him for a couple of years,

but have drawn a blank. He holds two callsigns, and both show the same address in the callbook but all mail is returned to sender marked "PO BOX CLOSED".

The man I'm trying to write to is CRAIG HUNTER VK2FCH (ex VK0CH). Craig worked for the Antarctic Division in 1990, and operated from Mawson Base, and Macquarie Island.

I've been attempting to contact him because I need to clear up a QSL query. I know that may sound utterly stupid, but the outcome of Craig's reply to me could decide whether I've achieved DXCC honour roll or not. I've worked very hard for 13 years towards this goal, and it all now hinges on one QSL card!

After writing to every friend I can think of in Oz, and months of packet broadcasts, faxes and letters, I've had no success. It appears that only the national circulation of the WIA magazine *Amateur Radio* is left open. Maybe he'll read it himself, he's a pretty active ham!

Paul Godolphin G4XTA
3 Knipe View,
Bampton, Penrith
Cumbria CA10 2 RF
UK

Liaison With Schools

Richard Jenkin VK1RJ called, in August *Amateur Radio* magazine, for greater liaison between schools and amateur radio. The city of Hervey Bay ARC, VK4CHB arranged with the headmaster of Urangan Point school to conduct a class on the subject of electronics in an entertaining way. For example, using lemons as a power source, etc and setting up amateur radio in the class room.

Mike Barrow VK4MRB and I were rather dubious as to how this invasion of the class room would be received. There was nothing to be concerned about. To any club contemplating a similar lesson, I say "go for it". The expressions on the faces were an absolute pleasure to behold.

Keep the surprises coming and the kids are with you 100%. One feels like a magician pulling rabbits out of the hat.

The school followed up by bringing two classes to our club rooms for further tuition and that went extremely well also. I am sure the children will remember their visit, and ours to their school, for quite a while and we have sown a seed. They and their parents now know that there is a hobby called amateur radio.

We also took advantage of newspaper and TV publicity for our unusual education activities.

Jim Beattie VK4WJB
ar

International Amateur Radio Union Monitoring Service (IARUMS) — Intruder Watch

*Gordon Loveday VK4KAL**

Owing to the fact that the bands are somewhat quiet, there has been a lull in the number of intrusions into bands. This, however, does not mean we can relax our surveillance. By the letters I receive from all over Australia, there is plenty to do. You should keep your collective ears in tune.

Here are a few stations to look for. One on 7.000 MHz spreads to 7.005 MHz, appears to be C3F or maybe F3E(SSTV), and to be coming into VK6 from the north at 1400/1500 UTC. Another station causing concern in the west is on 7.098 MHz exactly, running A3E with very distorted audio, and is non amateur.

There is growing concern at the increase of "pirate" stations originating from our northern neighbours, who are defiantly ignoring our right to operate within our bands. This activity is affecting all bands. One instance was brought to my notice by Karl VK6XW, and I quote "Two Indonesian stations deliberately interfered with the Australian Travellers' Net. They were repeatedly asked by net controllers VK6HH and VK6BO to QSY, but ignored the net. In the end the net had to QSY to 14.1175 MHz."

We should not have to "bow down" to this activity. I hate to think of the trouble in store for us when the bands come good again in a few years" time. I await with much interest the outcome of Singapore '94.

The new setup at my QTH is making it somewhat easier to get the info out of the logs. To all those who send those logs in, please accept my thanks, I wish there were more of you. To those who think it is a waste of time, are you in favour of the pirates invading our band space? It looks that way to me!

**Federal Intruder Watch Co-Ordinator, Freepost No 4 Rubyvale QLD 4702 or VK4KAL@VK4UN-1*
ar

An Old Timer Reflects....

Des Greenham VK3CO continues to look back over 50 years of amateur radio operation.*

It is 3 September 1939 and we have just heard the announcement from the Prime Minister that "We are now at war with Germany". To a young fellow of my age who had just got his ticket, this didn't mean too much, until we received a letter in the mail telling us to cease all radio transmissions immediately.

This was indeed a shock! After that, one could tune over the previously congested bands and hear nothing. There was now total silence. A short time later it was possible to hear an odd signal pop up on the ham bands with no call sign, and hear an answer, again with no call sign! These were illegal transmissions.

Can I confess, now, after 55 years that I was one of these illegal operators? Confession is good for the soul!

After some time, and a marked increase in illegal transmissions, the Government decided that this had to stop. So they came around to every radio amateur's shack and packed away our crystals, microphones, and final valves, etc. These were then placed in a big box and sealed with wire and a lead seal. This was the end of our "pirate" operating. After that we couldn't go "on air" and things quietened down on the bands.

Of course, we could still listen and this we did. We could hear DX stations not involved in the war still on air and we could listen to the war propaganda from all over the world, including "Lord Haw Haw" from Berlin and, later on, "Tokyo Rose" from Tokyo.

When a Japanese invasion of Australia seemed possible, the government took another step. They came around and picked up our sealed boxes and impounded them in some secret location to prevent this equipment falling into enemy hands.

Finally, in 1945, the war ended and we were handed back our boxes of "goodies". We were allowed to operate on 10 metres only, using a maximum power of 50 watts input to the final.

That was a great day. The sun spot cycle was at its best and we were able to work the world on 10 metres, and we did!

**16 Clydesdale Court, Mooroopna VIC 3629*
ar

Pounding Brass

*Stephen P Smith VK2SPS**

Over the last couple of months I have acquired quite a bit of information relating to telegraphy from technical publications from around the world. In this issue I have included what I think are the most interesting aspects of our hobby for your information.

In trying to keep abreast with technology, writing letters and studies, my on air activities have suffered somewhat. However, I don't think I am missing much as band conditions seem to be at rock bottom.

I recently received a letter from Ron VK4CRO, secretary of the "City of Brisbane Radio Society". Ron and fellow members are in the process of establishing a Morse tutor station which should be on air by the time you read this. I will report my findings when I receive further information from Ron.

Most amateurs these days have at least one computer situated in the shack, whether it's for packet or just for their favourite log program. If you don't have a CD-ROM drive fitted to your computer I would seriously think about getting one as the information on CD disk relating to our hobby is incredible.

I recently purchased from "Amsoft" a disk called "The World of Ham Radio May 94" and spent many a long night decompressing and downloading files for evaluation. The disk contains about 200 mb, covering every aspect of our hobby. I'm in the process of going through all the CW programs and will report my findings in a later issue.

A new product has hit the American market (and I believe will soon be available here). Introduced by Ken K6HPX, from "Cal-Av Labs", it is a new "Contact Cleaner", an electronic circuit that, when installed between the key and transmitter, virtually eliminates the noise from dirty and/or bouncing contacts in straight keys or bugs. The loaded and tested printed wiring board is available either alone, for building into other equipment, or installed in an enclosure with connectors and an internal battery holder. The contact cleaner operates either on an internal battery or from a 6-15 V source. The price for the printed wiring board is $US39.00, and for the enclosed version is $US55.00. Further enquires to Ken K6HPX, 515-B Westchester Dr, Campbell, CA, 95008, USA (tel 408-3691000).

Turning our attention to "Morse Keys" there have been some interesting developments from overseas. Derek Stillwell, an instrument maker from Shropshire, is now producing limited quantities of straight keys. The keys are individually made, hand finished and assembled, and destined to become collectors' items.

Looking at the key, its design is very similar to the straight keys produced by Kent which are sold here in kit form.

The key has a solid brass arm and bearing block fully adjustable, and the base is made of polished marble. Each key is serial numbered. You also have the option of having your call sign engraved upon the key. For further enquires, contact Derek Stillwell, 27 Lesley Owen Way, Shrewsbury, England SY1 4 RP.

Also from the UK, G4ZPY Paddle Keys International has come up with the first commercially available "Single Lever Combo". If you get tired using the single lever and would like to change over to a twin lever, there is a jack socket fitted to enable another key to use the same iambic keyer. Send a SAE or 2 IRCs to G4ZPY Paddle Keys International, 41 Mill Dam Lane, Burscough, Ormskirt Lancs, England L40 7TG. You will receive a beautifully presented colour catalogue of his many products.

"Bencher" in the USA, with whom we should all be familiar as it produces the "BY" series iambic paddles and the "ST" series single lever paddles, has now introduced two straight keys to their range. The RJ-1 model (170-61), has a black base and chrome components and the RJ-2 model (170-62) is an all chrome construction. Each key has oil-impregnated centred bronze bearing pivot points which impart friction-free pivoting, wobble free vertical tracking, stainless steel locking screws, steel base with non skid feet and a large black navy knob (very similar to the HI-Mound range). The RJ-1 is priced at $US69.95 and the RJ-2 at $US79.95. Further enquires to Bencher Inc, 831 N Central Ave, Woodale, IL, 60191 USA. They will send a four page colour brochure relating to all Bencher products.

QRP Scene

From the UK, Peter PE1MHO, a member of the "G-QRP Club", has made the "Master Roll of Honour". Peter is one of the very few (less than 100) to gain this prestigious award. Quite an achievement, considering there are some 8,000 members world wide. Congratulations, Peter, on a job well done.

A QRP version of the "Ten Tec Scout 555" is soon to be released. At this stage I have no further information from the company. I will report when it becomes available.

The number of QRP Clubs around the world is slowly increasing, with 17 listed at present.

Now, a request. I recently received a letter from a 17 year old Kenyan youth named Mark who has just undertaken his RAE exam and is anxiously waiting for the result. He is also undertaking Morse at his local radio club. Mark would like to correspond with someone in Australia. How about it? Mark's address is Mark Kiptoo Yego, PO Box 25, MDI University, Kenya, Africa.

Next month we will have a look at the 8044 series IC Chip.

**PO Box 361, Mona Vale NSW 2103*

ar

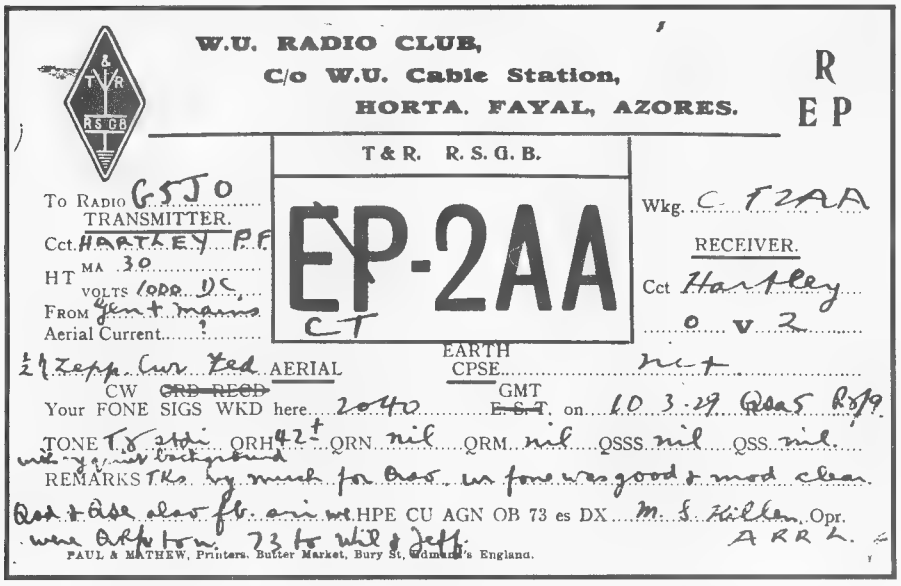
QSLs from the WIA Collection

Ken Matchett VK3TL Honorary Curator WIA QSL Collection*

The Azores

This Portuguese territory is a very isolated archipelago of nine small islands lying approximately half way between Portugal and the American mainland. Some people believe that the islands may be the legendary "Lost Atlantis", Plato's description of a paradise on earth west of the "Pillars of Hercules" (the Straits of Gibraltar). In any case, they were known to some ancient races of people including the sea-faring Carthaginians, but were colonised by the Portuguese in the 1430s. The great Christopher Columbus was forced to land here due to severe storms on the way home from his discovery of the New World and was taken prisoner by the Azoreans. Not surprising really since, at the time, the famous navigator was in the pay of Spain.

The earliest amateur radio call sign allocated by the ITU to the Azores was the "Intermediate" EP (E = Europe, P = Portugal) at the same time Australia received OA (O = Oceania, A = Australia). These became effective from 1 February 1927. They were called intermediates since the letters joined the two call signs of the communicating stations. For example, if Australian station 3AD was calling Portugal (or the Azores) 2AA, he would transmit 2AA epoa 3AD (the intermediate was normally written in lower case). Later, in 1929, the intermediate became incorporated in the callsign itself, eg EP2AA de OA3AD, the word "de" (from) taking the form of the intermediate itself. At the famous Washington Conference all callsigns were changed that year, Portuguese colonies


W.U. RADIO CLUB,
C/o W.U. Cable Station,
HORTA. FAYAL, AZORES.
R
E P
T & R. R. S. G. B.
EP-2AA
CT
To Radio G5JO
TRANSMITTER.
Cct. HARTLEY P.P.
HT MA 30
VOLTS 1000 DC
FROM Genl Mains
Aerial Current ?
½ Zepp. Cur Fed AERIAL
CW ~~CRD RECD~~
Your FONE SIGS WKD here 2040 E.S.T. on 10.3.29 QSA5 R5/9
TONE T8 ~~210~~ QRH 42 QRN nil QRM nil QSSS nil QSS nil
wil-y-gwer background
REMARKS TKs very much for QSO. Ur fone was good & mod clear.
Rec'd QSA also fb. ant. HPE CU AGN OB 73 es DX M. S. Killen Opr.
were QRP tonn. 73 to Wil & Jeff.
AKA.
Wkg. C. T2AA
RECEIVER.
Cct Hartley
0 V 2
EARTH
CPSE nil
GMT
PAUL & MATHEW, Printers, Butter Market, Bury St. Edmund's England.

being allocated the prefix CR (eg CR9 Macao, CR10 Timor) and Portugal, Azores and Madeira Island being allocated prefixes from the batch CSA — CUZ. The actual selection for Azores was CT2 (CT1 = Portugal mainland, CT3 = Madeira Island).

EP2AA

This is the earliest pre-World War II QSL from the Azores in the WIA National QSL collection and is dated 10 March 1929. The operator, M S Killen, has altered the intermediate EP to the newly-allocated prefix CT. Several early QSLs emanated from Horta, the only town on the westerly island of Faial (Fayal) where the Western Union cable station was sited. It was, incidentally, the scene of the last naval battle (in 1814) between the British and American forces during the War of Independence.

CT2FA

This QSL clearly shows the geography of the Azores, a name derived from the Portuguese word for goshawk. The QTH was on the island of Terceira just to the north of the largest island, Sao Miguel. The latter island (the largest of the islands) has the largest city in the Azores, Ponta Delgrada, and the colony's main port. More than half the Azorean population live on the island of Sao Miguel. The QSL card was received by an Old Timer, Jeff Whyte VK2AHM, now a "Silent Key".

CU0SM

In 1986 the CT2 prefix for Azores was replaced by a CU prefix. In fact, the numbering was such that the particular island was identifiable. For example, CU1 was allocated to Santa Maria, CU2 to Sao Miguel, CU3 to Terceira, CU7 to Faial, and CU8 to Flores. Prefixes for the remaining four islands are quite rare.

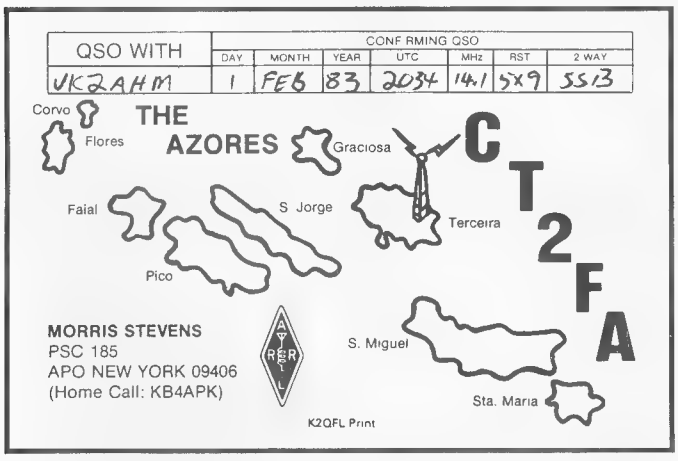
The CU0SM QSL shown was a special prefix allocation which celebrated over 500 years of Portuguese colonisation. There has been considerable amateur radio activity from this island during the 1970s and 1980s, much of it by airport staff (eg CT2AH, CT2DU and later CU1AF and CU1EZ). This card was received by Barry VK3XV for a QSL during the celebratory year. Regarding the CU prefix, WPX hunters will be pleased to know that upon one QSL, from CU2AK, there is provision for the use of another ten CU prefixes from CU20 through to CU29.

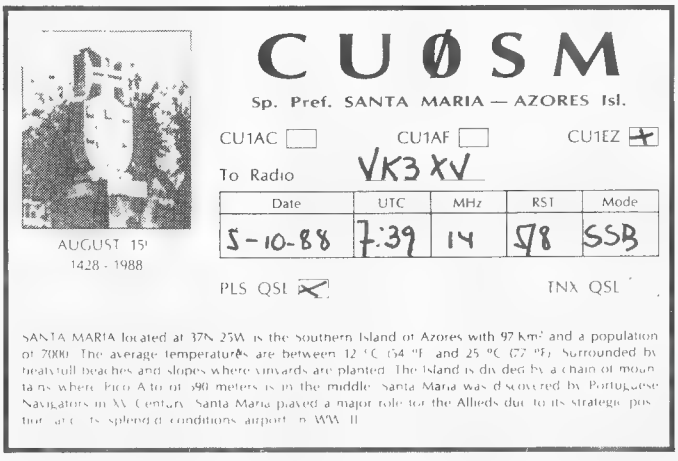
The prefix CS has also been used for Azores. The special prefix CS2 was, for example, issued during 1993 to commemorate the World Communications Year, although it had been used quite frequently by Sam CS3AC in tbe 1950s, an excellent QSLer who operated from the island of Terceira.

Like the Spanish, the Azoreans carry on century-old traditions which also become tourist attractions. Of particular note are the Espirito Santo (Holy Ghost) festivals and the "Tourada a Corda", a bull fight of a different type in which the bull is run through the streets held by a cord, an event which, one is pleased to say, does not conclude with the death of the animal. Certainly the Azores has great tourist potential. Many of the islands show evidence of volcanic origin with their geysers and hot springs. There is also lush vegetation, mountains and lakes, but the big drawback is its isolation. The Azores has been described as the "Aerial Crossroads of the Atlantic" but transportation remains an expensive item. The national Portuguese airline conducts frequent services and there is modern ferry and aerial transportation between the various islands. Often regarded as "backward" (due to lack of capital investment by Portugal) there have been promising changes of late, particularly since the entry by Portugal in 1986 into the European Economic Community. Hopefully, we can look forward to more amateur radio activity from this island location.

*4 Sunrise Hill, Montrose VIC 3765
Tel (03) 728 5350

ar




CUØSM
Sp. Pref. SANTA MARIA — AZORES Isl.
CU1AC
CU1AF
CU1EZ
To Radio VK3XV
Date UTC MHz RST Mode
5-10-88 7:39 14 58 SSB
PLS QSL
TNX QSL
AUGUST 15th
1428 - 1988
SANTA MARIA located at 37N 25W is the Southern Island of Azores with 97 km² and a population of 7000. The average temperatures are between 12 °C (54 °F) and 25 °C (77 °F). Surrounded by beautyfull beaches and slopes where vinyards are planted. The Island is div ded by a chain of mountains where Pico Alto of 590 meters is in the middle. Santa Maria was discovered by Portuguese Navigators in XV Century. Santa Maria played a major role for the Allieds due to its strategic position and its splendid conditions airport in WW II

Technical Correspondence

Thanks to Doc VK4CMY for his interesting articles in *Amateur Radio* on vertical antenna design.

I wish, however, to point out that the placement of his matching network is inappropriate if optimum radiation efficiency from a multiband vertical system is a design requirement. If open wire transmission line is used to feed power to an "untrapped" vertical antenna over more than one frequency range, the matching network must be placed between the base of the vertical and its ground system. Only then will feeder currents be balanced (currents equal in amplitude and close to 180 degrees out of phase) and the feed line not radiate.

With Doc's system the feed line will radiate, because the feed line currents will be unbalanced (with respect to amplitude and phase) and, therefore, this "feed line" will be part of the radiating system. A substantial part of the source return current is likely to pass through the local ground G1 and not the remote radial system G2. The efficiency of Doc's system will therefore depend on a number of factors such as the feed line length, the vertical length, and relative conductivities of the local and remote radial grounds, all at the operating frequency (see Fig 1).

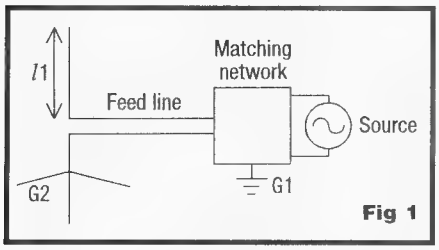


Fig 1

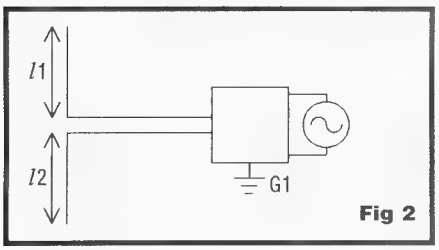


Fig 2

Felix VK4FUQ was, I believe, alluding to this fact even though he did not quite hit on it. Had Felix said that it was a bit like feeding an unbalanced dipole with open wire line he would have been close to the mark (see Fig 2).

If I1 does not equal I2, the feed line currents will differ in phase from 180 degrees because of the unequal path lengths along I1 and I2 (boundary conditions require zero currents at the end of I1 and I2) and the amplitudes of these currents will decrease, along the feedline, due to the radiation that will take place from the feed line. The source return current will now be split into two parts. One part will flow through the local ground G1 and the remainder through the lower feed wire to I2 (unless $I1=I2+n*\lambda 2$ at the lowest wavelength for which the system is to be used and n is an integer 0, 1, 2...).

If the angle between I1 and I2 is now decreased from 180 degrees to 90 degrees, only the radiation pattern changes. The unbalanced feed line will still radiate and the antenna return current will still be split between G1 and G2 (see Fig 3).

This unbalance remains if N wires, each of length I2 or differing from I2, is

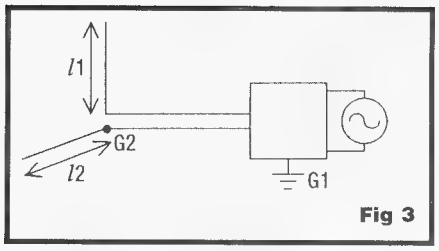


Fig 3

connected to G2. A large part of the source return current is still likely to pass through the local ground G1 and not the remote radial system G2. The efficiency of the system is therefore likely to be far from the optimum over more than one frequency range (see Fig 4).

In order to improve the efficiency of Doc's system as it stands, it will be necessary to replace the open wire with a single wire close to a large ground mat "half plane" and replace the local ground system with the radial system (see Fig 5).

Continued on page 48

Repeater Link

**Will McGhie VK6UU*

FM 828-9

At long last the final circuit diagram of the FM 828. I split up the original circuits, that I had drawn some time ago for our repeater project in VK6, into a size that could be reproduced in *Amateur Radio.* Originally I thought there would be six circuits, but there are nine in the series. There are also drawings of the component layout of the receiver board and the exciter board. However, it is not intended to reproduce them unless there are a number of requests. If you would like these layout drawings then I can send them to you.

The VHF power amplifier in the FM 828 is very stable and simple to tune up. Simply connect a VHF power meter or SWR meter and 50 ohm dummy load and adjust the trimmer capacitors for maximum output. With a 13.8 volt supply 25 watts should be achieved. Should the VCO become unlocked the voltage supply to the first transistor TR1 in the PA is removed.

The circuits of the Philips FM 828 you have been seeing in *Amateur Radio* were all drawn using the CAD drawing program Draft Choice. Once drawn the circuits were then printed onto A4 paper using my nine pin dot matrix printer. The printer output from Draft Choice to my printer is poor. Printer outputs to dot matrix printers from computer programs can be a hit or miss affair. You can be lucky and, with the right printer driver, print out a sharp copy. If not the results can be sub standard.

To produce a sharper printed image I use a printer utility program called PrintGL. This program takes a HPGL print file that Draft Choice can produce and prints out the results you see in *Amateur Radio.* Seems a long way round to have to "print" the drawing to a HPGL file and then load this into another program to print the final result, but the results direct from Draft Choice to my printer were not good enough.

The laser printer drivers in Draft Choice provide excellent results to both laser printers and inkjet printers. Even though I now have access to a better printer I decided to stay with the same quality output so all the FM 828 drawings would look the same.

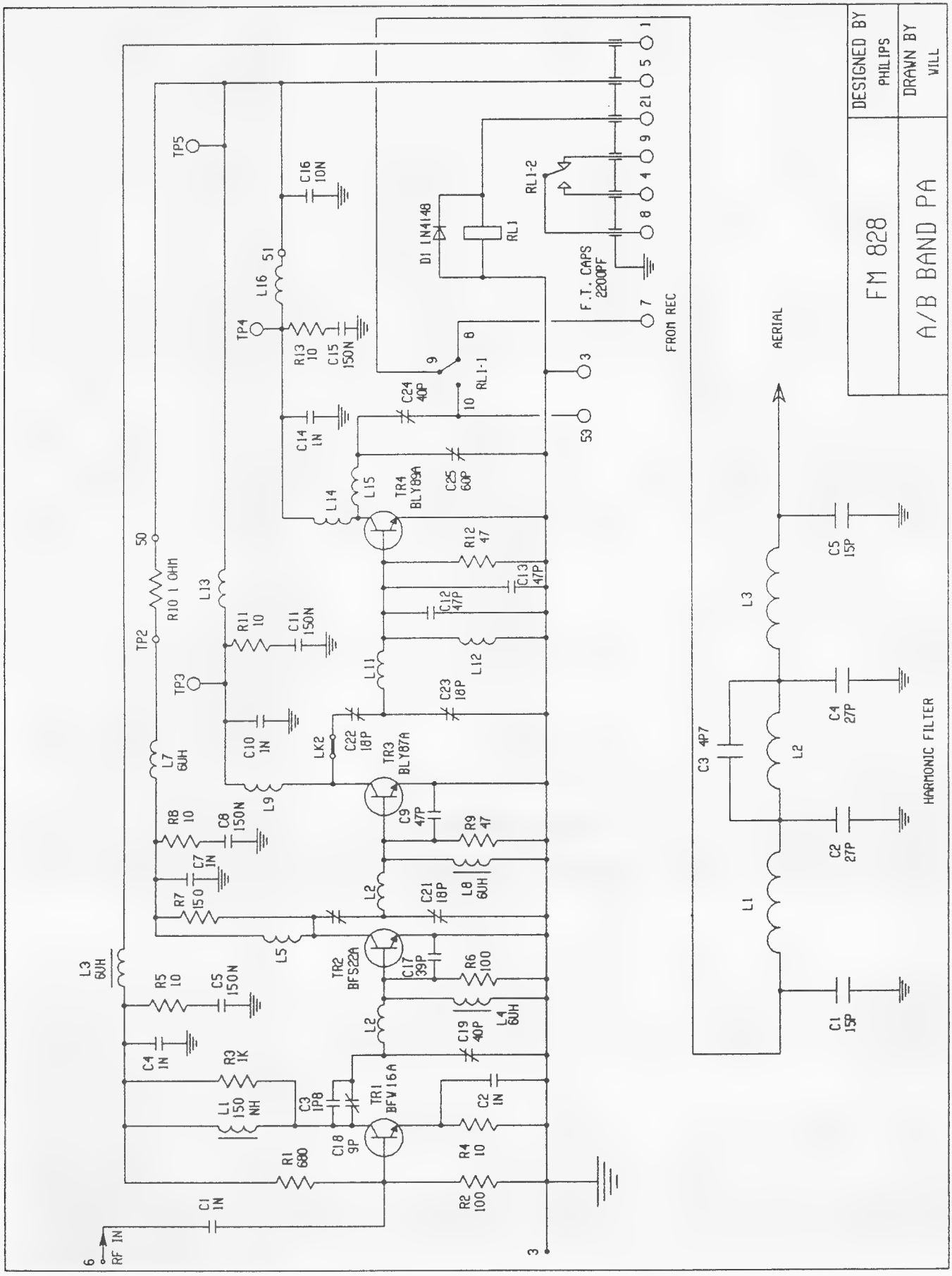
Thanks to all those that contacted me about the FM 828 drawings over the past several months. Several copies of the CAD drawings have been sent to amateurs via Packet Radio or Australia Post on disk. Even a request from Papua New Guinea was received. If I did not answer your request via the mail or Packet Radio, please contact me again as your request may have gone astray.

In closing with the last Philips FM 828 drawing, a special thanks to Philips for allowing these drawings to be reproduced, and to *Amateur Radio* for reproducing them on a full page.

Next month some simple tune up instructions on the FM 828.

**21 Waterloo Cr, Lesmurdie WA 6076*
VK6UU@VK6BBS

ar


FM 828
A/B BAND PA
DESIGNED BY PHILIPS
DRAWN BY WILL
HARMONIC FILTER
AERIAL
FROM REC
RF IN
TR1 BFW16A
TR2 BFS22A
TR3 BLY87A
TR4 BLY89A
D1 IN4148
RL1
RL1-1
RL1-2
F.T. CAPS 2200PF
R10 1 OHM

Continued from page 46

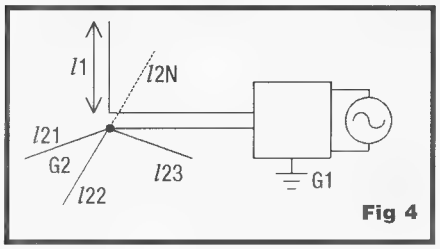


Fig 4

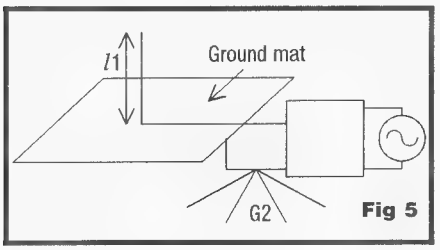


Fig 5

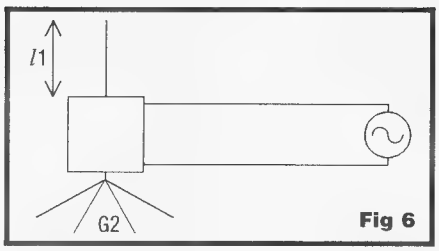


Fig 6

But, of course, the proper and best solution is to place the matching network at the base of the antenna. This is an optimum design axiom. The network must then, unfortunately, be remotely controlled from the shack (see Fig 6). But, who was it who said, "life was not meant to be easy"?

Tim Hunt VK3IM
20 Ravenscourt Crescent
Mt Eliza VIC 3930

ar

Stolen Equipment

The following equipment has been reported stolen. If you have any information that may lead to the recovery of the equipment, please get in touch with the advised contact as soon as practicable.

Make:	Kenwood
Model:	TH-28A & TH-28A
Serial Numbers:	41003177 & 41003180
Type:	VHF Handhelds
Stolen from:	14 Church St, Bayswater 3153
Date:	14 July 1994
Owner:	Strictly Ham Pty Ltd
Contact details:	(03) 729 7656

ar

Spotlight on SWLing

*Robin L. Harwood VK7RH**

Radio Australia in Melbourne, which has been based in Glen Waverley since 1984, moved their studios and administration to a brand new radio complex at Southbank Boulevard in South Melbourne, where the domestic networks have been relocated. The postal address of GPO Box 428G, Melbourne 3001 is unchanged. However, the telephone and fax numbers are now 03 626 1800 (Switchboard), 03 626 1914 (Transmission Management), 03 626 1899 (Fax), and 03 626 1916 (Fax).

The 24 hour Openline facility no longer is available. The changeover happened smoothly on 12 August.

Long time American religious broadcaster, KGEI, in San Francisco, California, ceased its shortwave operations recently. KGEI is one of the historic pre-war callsigns being originally allocated to the American General Electric Company. The station broadcast General Douglas McArthur's famous wartime speeches to the Philippines. After the war the station was acquired by the Far East Broadcasting Company and mainly broadcast religious programming to Latin America, as well as to the Soviet Union. The organisation continues with its transmitters in the Philippines, Saipan and in South Korea.

Another historic VOA site, at Bethany, Ohio, will shortly also cease operations. This has been brought about by budgetary cutbacks within the organisation. Many technicians will be out of a job there and also at the huge Greenville, North Carolina site, where a satellite facility will also cease.

The VOA is pinning their faith in co-operative ventures with domestic networks, particularly in Latin America. It has been noted that there has been a significant reduction in the Latin shortwave audience, so the "Voice" thinks placing programming over domestic stations will reach a wider audience, despite the obvious failings of not having control over program content.

I have noted an increase in Creole programming to Haiti from the VOA, also in the output of the surrogate "Radio Marti" to Cuba. Both areas are currently dominating American thinking.

I have been informed by a British SWL that there will be a challenge to SWLs to coincide with the "CQ" Worldwide Phone Contest. The operational hours are identical, that is from midnight UTC on 29 October to 2359 UTC on 30 October. The rules of the Contest are as follows:

1. There are no time restrictions. You may log at any time during the specified period.
2. Only one station from each DXCC country can be logged on each of the main operational bands. Note that WARC bands are excluded.
3. Points will be allocated as follows: From your own continental area, 1 point on each band. All contacts outside your continental area, 5 points on each band. Your final score is the total points on all bands multiplied by the total DXCC countries on all bands.

Your entries must contain the Date and Time in UTC format, callsign of the station heard only, the RST at your location (minimum report 4X4), together with the band. A multiplier check sheet must be included with your entry. Computer-generated logs are quite acceptable. Send your logs, postmarked no later than 28 November to Bob Treacher BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ ENGLAND. For a copy of the results, please include either two IRCs or a green stamp.

In conclusion, please note that my snail mail address for the next column will be c/- 5 Helen Street, Newstead, TAS 7250. The e-mail address is either FIDONET 3:670/312 or INTERNET: robroy@clarie.apana.org.au.

Until next time, the very best of 73 and good monitoring.

**54 Connaught Crescent, West Launceston TAS 7250*
VK7RH@VK7BBS LTN.TAS.AUS.OC

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Don't buy stolen equipment — check the serial number against the WIA Stolen Equipment Register first.

QSP News

Introduction of Class Licensing for CB and Handphone Services

The SMA will introduce separate class licenses for CB (other than repeaters) and 27 MHz Handphone services from 3 October 1994. This decision was made following public consultation during the inquiry into the apparatus licensing system earlier this year.

Class licensing received strong support in submissions to the inquiry.

Class licensing authorises the operation of equipment without the need for individual user licensing. The good news for CB and Handphone users is that licence fees will no longer be payable after 3 October 1994.

According to the SMA, the introduction of class licences does not mean that CB and Handphone services will be deregulated. Licence conditions, similar to those applicable under the current licensing arrangements, will still apply and equipment will still need to comply with the existing technical requirements.

Users of CB and Handphone equipment who are in breach of the licence conditions will still face penalties under the Radiocommunications Act. For example, operating out of band or using a linear amplifier is still an offence under the class licence.

Further consultation will be undertaken over the next year on the possible introduction of class licensing for Amateur and 27 MHz Marine services.

SMA offices in capital cities and regional centres have more information about the new CB and Handphone class licences.

VHF/UHF — An Expanding World

*Eric Jamieson VK5LP**

All times are UTC

10 GHz

Well, occasions do arise when one has only to make a statement that something has occurred, for the first time only, to find someone has done it before!

I recently referred to the "tongue-in-cheek" contact between David VK5KK/3 and Roger VK5NY/5 as being possibly the first VK5 to VK3 contact on 10 GHz at a distance of 16.5 km.

Trevor VK5NC quickly advised me that he, in fact, was part of the first such contact as follows. On 25/4/93 at 0625 he contacted VK3ZQB/p with signals 5x9 each way. VK3ZQB operated from Delcartes Bay near Bridgewater and VK5NC was at Cape Northumberland, using FM on 10.250 GHz, power 20 mW to a 30 cm dish, receiver an MR301, distance 68.75 km. This contact was referred to in an earlier edition of *Amateur Radio.*

However, all is not lost. The VK5KK to VK5NY contact was probably the first narrow-band contact across the border on that band! The facts should now be in order and I am pleased Trevor advised me.

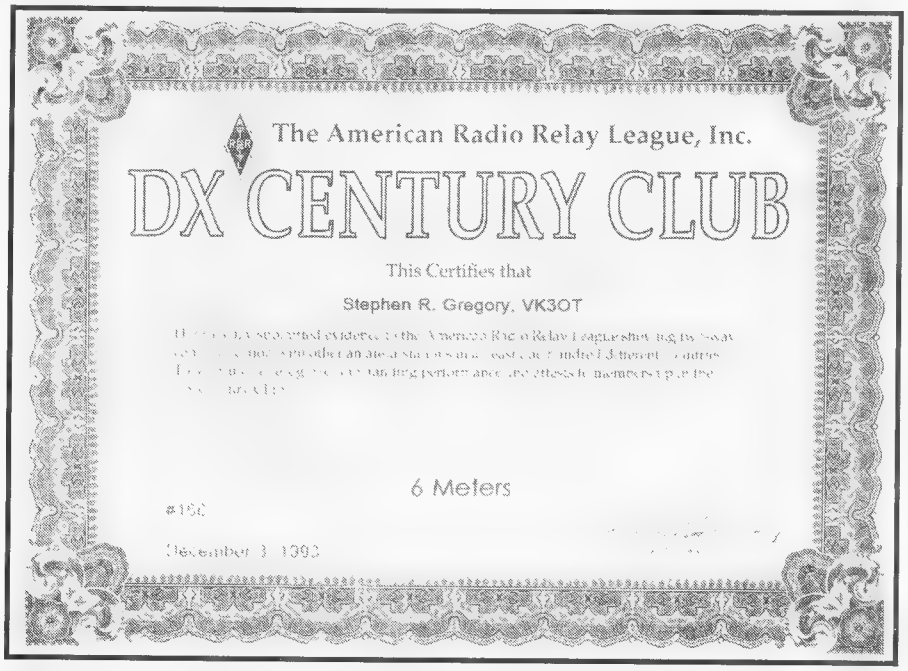
Wally VK6KZ writes to say that 10 GHz is moving slowly in Perth. Keith VK6XH sold his kit to Neil VK6BHT in Geraldton who now has two units, so Wally is the only narrow-band enthusiast in Perth, although Alan VK6ZWZ and Al VK6ZAY have adapted some 12 GHz LNBs for reasonably narrow-band low power transmitters and receivers. Wally VK6WG in Albany has been silent on 10 GHz activities while enjoying the warmer weather of Queensland.

Ross Hull Memorial Contest

This contest commences in December and **Wally VK6KZ** sent me a copy of a letter he forwarded to the Contest Manager. There are a few valuable points to which I would like to refer. I ask that you read them and be prepared to lend support if you see value in them.

Wally says, *Could the Ross Hull rules and dates be released in the July issue of Amateur Radio each year? This would allow analysis and discussion of the results of the previous Contest (usually available at the beginning of April) by those who think the rules should be changed.*

In your reflections of the 1993/94 contest you suggested that a longer period might be chosen with the idea of then using the best 100 contacts on each band. I have a mixed reaction to that proposal and I appreciate the difficulty of finding rules that



Australia's outstanding 6 metre operator, Steve Gregory VK3OT, achieved world fame on 19 November 1993 when he became the first amateur in the world to work Antarctica on 6 metres (VK0AQ at Casey Base). This contact enabled Steve to become the first Australian amateur to qualify for DXCC on 6 metres.

will maximise the interest in participation. I am certainly not troubled by a low number of logs submitted to the Contest Manager — I feel most people use self assessment as to whether it is worth the effort of preparing (or re-writing) a contest log. It is the number of call signs appearing in contest logs that is a better gauge of the success of the contest (and the rules!).

Wally also mentions he may operate from Cocos Island during the time of the contest. The distance to Perth is 2900 km which is about 600 km above the maximum calculated single Es hop and not far enough for true double hop. However, over many years there have been thousands of single-hop contacts made in Australia at distances around 1600 km, so anything is possible. If there is a return of the excellent Es conditions which prevailed last year then Wally may well be heard in places other than Perth. More later.

More from Perth

Peter VK6BWI would like to advise interstate operators that, for some years, there has been an operational six metre repeater in Perth. The repeater transmits on 53.800 MHz, receives on 52.800 MHz and is linked to a 70 cm repeater. The six metre repeater has been worked in the Eastern States during previous years.

Peter says we all know that being there at the right time is crucial and the repeater may be a means to achieve more contacts across the continent. Presently in Perth there is some interest in converting FM 828s to six metres which may lead to increased local usage of the repeater.

Peter's equipment is home-brew with a car radio plus converter for receiving and using slope detection for FM. The transmitter is a conventional FM unit to which are being added facilities for DSB/CW operation. Good SSB reception can be achieved by adding a BFO to the receiver combination. Good work Peter, it is interesting to note there are still operators who do not use black boxes!

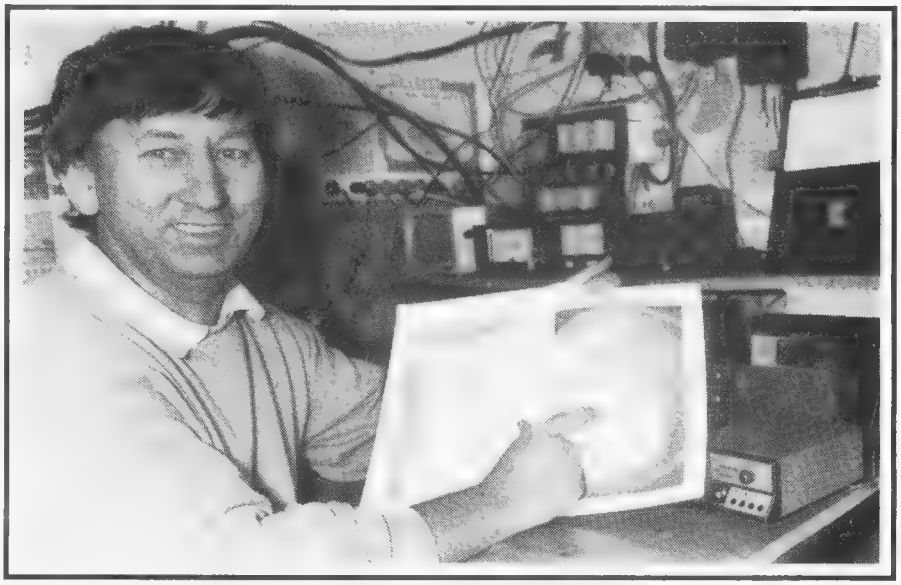
From the United States

Emil Pocock W3EP in his *QST* column *The World Above 50 MHz* for September 1994 reports that June 1994 will be long remembered as one of the most incredible months in radio's history for sporadic-E propagation on the VHF bands.

Emil reports Larry N0LL observed E-skip on 50 MHz every day of the month except 1 June. Long-time FM-band DXer, Pat Dyer WA5IYX, recorded over 3500 minutes of sporadic-E signals on 88 MHz or higher during June, the third-highest month he has observed in over 20 years of continuous monitoring. That works out to an average of nearly two hours per day. In view of these indicators, it should come as no surprise that there were nine separate 144 MHz sporadic-E openings on eight days in June. But this is not all! At least two 222 MHz E-skip contacts were completed during the widespread 2-metre openings of 21 and 22 June.

The spectacular sporadic-E conditions were not limited to North America. Canadians and Americans — and not only those on the East Coast — worked Europe on seven days in June, and the band opened on four other days to the Azores or North Africa only, for an astonishing total of 11 days of trans-atlantic 50 MHz propagation.

Emil's columns are full of interesting Es events, tending to indicate that the two world hemispheres do appear to follow one another, especially during the low part of the sun-spot cycle. On this basis we should be blessed with another excellent Es period during our summer months.



Steve VK3OT, pictured in his shack, proudly pointing out the location of VK0AQ on a map of Antarctica.

1994 EME Contest

Chris VK5MC sent information to say that the Toronto VHF Society VE3ONT will participate in the ARRL EME Contest using the Institute for Space and Terrestrial Science's 46 m (150 foot) Algonquin Park dish in grid square FN05xw. This year's operation will provide an increased opportunity to work 144 MHz stations.

Because the Algonquin dish has a 9 degrees lower elevation limit, stations with horizon fixed antennas have a limited chance to work VE3ONT. As in 1993, VE3ONT will operate "split". The following operating hints will improve your chances of making a QSO.

Do not call on VE3ONTs Tx frequency, pick a random frequency in the listening range. Use the full range, we will be looking for stations in the clear.

VE3ONT will use circular polarisation on all bands. You may use linear or circular polarisation to work us and, if circular, use RHCP on Tx and Rx for 144 and 432. On 1296 we will have switchable sense. Use either the satellite or EME polarisation convention.

Conditions permitting, VE3ONT may start each operating period on SSB to work strong stations as quickly as possible. Please do not call again for a second contact on CW. Conversely, if you work us on CW please do not call again for an SSB QSO.

All contacts will be "random" with no schedules or sequencing. Please be patient, the QRM on our end was intense in 1993.

Low power and OSCAR class stations are encouraged to make an EME contact. 100 watts delivered to a single long Yagi should be sufficient on 144 and 432. On 1296 stations were worked with as little as 10 watts and a 2 m (6 feet) dish in 1993.

UTC Date	VE3ONT Tx Freq	Listening Range	Approx Times
Oct 29	432.050 MHz	432.050 — 432.060	0645 — 1815 UTC
Oct 30	1296.050	1296.050 — 1296.060	0754 — 1844
Nov 26	144.100	144.100 — 144.110	0538 — 1645
Nov 27	144.100	144.100 — 144.110	0646 — 1713

Use of the dish is always subject to last minute pre-emption for non-amateur purposes.

QSLs with an SAE to Dennis Mungham VA3SO, RR 3, Mountain Ontario, Canada KOE 1SO. Reception reports will also receive a QSL. Be sure and send an EME contest entry to the ARRL as the above dates are for the ARRL EME Contest in addition to VE3ONT.

From Jersey

Geoff GJ4ICD said conditions were good for the National Field Day on 2/7 with new stations being RU1A, DL9GKA and EW7IM. On 3/7 he worked 5T5JC using his 50 MHz mobile station. Also, in late June he worked VP9 and W1, 2, 3, 4 and 5 via Es. One would have to be impressed with those contacts.

The Jordan expedition yielded 2000 contacts in 49 countries. The trip cost Geoff 3419 pounds plus loss of earnings as his TV shop was closed. Despite this he is looking at making an expedition to D44 (Cape Verde) which is about the same distance as Jordan.

Statistics

Steve Stephens VK4KHQ writes to say he has not been very active since returning to Brisbane and, on six metres, is presently limited to a quarter-wave whip on the roof.

Steve has spent some time analysing my list of First Worked Countries which covers the period 1947 to 1993 on a monthly basis. In condensed form the following should convey the results of his research.

New countries for 1993 3, 1992 10, 1991 22, 1990 19, 1989 43, 1988 1, 1987 1, 1986 0, 1985 1, 1984 3, 1982 5, 1981 12, 1980 4, 1979 8, 1978 5, 1977 1, 1976 1, 1975 2, 1974 1, 1973 0, 1972 1, 1971 0, 1970 1, 1969 2, 1968, 67, 66, 65, 64, 63, 62, 61 all 0, 1960 1, 1959 4, 1958 5, 1957 0, 1956 1, 1955, 54, 53, 52 0, 1951 1, 1950 0, 1949 1, 1948 0 and 1947 3, total 173.

Over the above spread of years the monthly totals were Jan 8, Feb 9, Mar 43, Apr 33, May 9, Jun 2, Jul 0, Aug 3, Sep 7, Oct 26, Nov 14, and Dec 9, total 173.

From the above one can see the influence of the solar peaks with special emphasis on the equinoxial periods; the greatest number of new countries appeared in March/April or September/October.

There are also a few lessons to be learned. First, I am sure we could have done much better during the 1969 and 1979 solar peaks if we had been more vigilant in our pursuit of countries. We simply didn't know how to exploit what was available, especially during 1979 when everyone had converted to CW/SSB transceivers. I am sure we had a form of complex that only those people in remote regions such as Darwin stood a chance of working long distances via F2. We in southern climes believed that we were too far away from overseas countries.

When we finally educated ourselves and began to analyse the habits of six metres we found that the years 1989 to 1992 inclusive had much to offer, especially as European countries were opened to six metres. With permission granted for us to operate on the low end of 50 MHz we were then able to join so many countries already with that facility.

Cycle 19 of 1958 would have provided more countries if we had had access to the logs of many amateurs who are now Silent Keys. Considering the various circumstances, we are fortunate to have achieved a most creditable tally of countries worked from Australia and can hold our heads high when the head count commences!

Closure

By the time you read this it will be the equinox but whether there will be extended propagation we will see in due course. The sporadic-E season is not far away and normal expectations would be for an excellent season with many extended distance contacts, so make the most of the low part of the solar cycle. If you are able to make contacts of extended distance or of special interest I am always pleased to hear from you.

Closing with two thoughts for the month:

1. When you come in late for work, everybody notices; when you work late nobody notices, and,
2. Politicians and crabs are creatures who move in such a way that it is impossible to tell whether they are coming or going.

73 from The Voice by the Lake.

**PO Box 169, Meningie, SA 5264*
Fax: 085 751 043 Packet: VK5LP@VK5ZK

QSP News

Italian DXer Activates Region 3 ... Again

Carlo I4ALU on the left with Tom VK2ATJ.

During an August stopover in Sydney between his home in Bologna and several destinations in the Pacific, noted Italian CW DXer and IOTA (Islands on the Air) advocate, Carlo I4ALU enjoyed an eyeball contact with Tom VK2ATJ.

Carrying a complete station from Italy, Carlo operated 3D2CA in Fiji for two weeks and spent time in Hawaii as KH6/I4ALU.

During mid 1992 Carlo activated Fiji's Yasawa Islands as 3D2CA, North Cook and South Cook as ZK1AL and Western Samoa as 5W1KH.

Region 3 won't be on I4ALU's itinerary next year, however, as Carlo will be in England for the centennial celebrations of Guglielmo Marconi's first wireless telegraph.

Thomas E King VK2ATJ

Sign up a new WIA member today — We need the numbers to protect our frequencies and privileges.

HF PREDICTIONS

Evan Jarman VK3ANI

The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for five of the bands between 7 and 28 MHz. The UTC hour is the first column; the second column lists the predicted MUF (maximum useable frequency); the third column the signal strength in dB relative to 1 μV (dBU) at the MUF; the fourth column lists the "frequency of optimum travail" (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1 μV in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50 μV at the receiver's input and the S-meter scale is 6 dB per S-point.

V in 50 ohms	S-points	dB(μV)
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4
0.78	S3	2
0.39	S2	-8
0.20	S1	-14

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

VK EAST The major part of NSW and Queensland.

VK SOUTH Southern-NSW, VK3, VK5 and VK7.

VK WEST The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

The sunspot number used in these calculations is 22.3. The predicted value for November 22.2.

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VK SOUTH — SOUTH PACIFIC

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	18.3	16	15.2	-6	22	17	8	-4
2	18.6	16	15.8	-5	23	18	10	2
3	18.6	17	15.6	-2	24	18	10	2
4	18.7	17	15.5	2	25	19	10	-2
5	18.4	19	15.1	11	27	19	10	-3
6	18.0	20	14.6	24	30	20	10	-4
7	17.1	23	13.6	41	33	20	8	-9
8	15.8	26	12.5	47	31	16	2	-17
9	14.5	27	11.5	49	28	11	-6	-28
10	13.3	28	10.5	49	24	4	-15	
11	12.3	30	9.7	49	20	-2	-24	
12	11.6	30	9.2	48	17	8	-31	
13	11.1	31	8.8	47	14	12	-37	
14	10.8	31	8.5	47	12	-16		
15	10.5	32	8.2	46	10	-18		
16	9.7	33	7.5	45	5	-26		
17	9.6	33	7.3	44	3	-29		
18	9.3	33	7.1	44	0	-34		.
19	9.9	26	7.5	31	4	-24		.
20	11.6	20	8.7	19	12	-8	-28	.
21	14.2	18	10.9	9	18	5	8	-29
22	16.3	17	12.7	2	21	12	2	-14
23	17.4	17	13.9	-2	22	15	6	8
24	18.1	16	14.7	-5	22	16	8	-5

VK WEST — SOUTH PACIFIC

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	22.1	13	18.0	38	17	18	14	7
2	22.3	13	18.5	39	16	18	15	8
3	22.8	13	17.1	-38	17	19	16	9
4	22.8	13	19.1	-33	19	19	16	9
5	22.8	14	18.9	-24	21	21	17	10
6	22.5	16	18.4	-9	25	23	18	10
7	21.8	18	17.4	10	30	25	19	10
8	20.2	20	16.0	28	33	26	18	6
9	18.6	23	14.7	42	35	25	15	1
10	17.0	25	13.4	46	34	21	10	-5
11	15.7	27	12.4	48	32	18	5	-12
12	14.9	28	11.8	49	30	15	1	-18
13	14.1	29	11.1	48	28	12	-3	-24
14	13.5	29	10.6	48	27	9	-7	-29
15	13.0	30	10.3	48	25	7	-10	-33
16	12.8	30	9.9	47	24	6	-11	-35
17	11.6	32	8.9	46	21	0	-18	
18	11.5	32	8.8	46	20	-1	-21	
19	11.3	28	8.6	36	17	-3	-23	
20	12.0	22	9.1	20	16	0	-16	
21	14.2	18	11.2	3	18	8	-3	-21
22	17.4	15	13.3	13	19	14	7	-5
23	20.0	14	15.6	26	18	17	12	3
24	21.3	13	17.0	-34	17	18	14	6

VK EAST — AFRICA

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	12.6	10	9.2	-16	9	0	-11	-28
2	11.3	4	8.7	-28	5	-2	-13	-31
3	11.8	1	9.0	...	4	-1	-11	-26
4	15.1	4	11.4	...	3	4	-1	-11
5	19.4	7	14.3	...	2	7	5	0
6	19.8	6	14.5	...	1	7	5	0
7	20.1	7	14.8	...	1	7	6	0
8	19.3	7	14.6	...	3	7	5	-1
9	17.9	8	14.2	...	5	7	4	-4
10	16.4	8	13.0	...	8	7	2	-8
11	15.0	10	11.8	-33	10	6	-1	-14
12	13.8	12	10.9	-17	11	4	-5	-20
13	13.0	15	10.2	-2	13	3	-9	-27
14	12.4	20	9.8	14	16	2	-12	-33
15	12.0	25	9.5	31	18	1	-16	-39
16	11.7	27	8.9	37	18	0	-18	..
17	11.4	29	8.3	40	17	-2	-21	
18	10.9	30	8.0	41	16	-6	-26	
19	10.5	30	7.6	41	14	-8	-30	
20	11.0	30	7.5	41	16	-5	-25	
21	10.7	28	7.4	36	14	-7	-28	
22	10.4	22	7.3	22	10	-9	-29	
23	10.2	17	7.3	10	7	-10	-29	
24	10.9	12	7.9	-3	8	-6	-21	

VK SOUTH — AFRICA

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	12.0	16	9.1	0	13	1	-12	-31
2	12.6	12	9.6	-13	11	2	-9	-26
3	15.9	12	12.5	-29	12	9	2	-8
4	19.7	11	14.6	...	10	12	9	1
5	20.7	9	15.2	...	7	11	9	3
6	20.9	9	15.2	...	6	10	8	3
7	20.6	8	14.9	...	5	10	8	2
8	20.1	9	14.4	...	6	10	7	1
9	19.4	9	13.7	...	7	10	7	0
10	18.1	10	12.7	...	10	10	5	-3
11	16.5	11	11.5	-32	12	9	3	-8
12	15.0	13	10.4	-16	13	7	-1	-15
13	13.6	15	9.4	-3	14	4	-7	-24
14	12.6	19	8.7	13	15	2	-12	32
15	12.1	25	8.3	31	18	0	-16	
16	11.6	27	7.9	36	17	-2	-21	
17	11.3	28	7.8	39	16	-4	-24	
18	11.0	30	7.7	41	15	-6	-27	
19	10.8	30	7.7	41	14	-8	-29	
20	10.9	30	7.8	41	15	-7	-28.	
21	11.4	29	7.9	42	17	-3	-22	
22	11.1	26	7.8	33	14	-5	25	
23	11.0	21	7.8	21	12	-6	24	
24	11.7	19	8.5	13	13	-2	-17	

VK WEST — AFRICA

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	11.4	20	8.7	16	13	-3	20	
2	11.9	16	9.1	0	12	0	13	-34
3	15.3	14	12.1	-15	15	10	1	-12
4	19.7	12	15.4	-37	14	14	10	1
5	21.0	11	15.9	..	11	13	10	4
6	21.2	10	17.7		9	12	10	3
7	21.2	9	17.6		8	12	9	3
8	20.9	9	17.1	...	8	11	9	3
9	20.4	9	16.5		8	11	8	2
10	19.5	10	15.6	..	10	11	8	0
11	18.1	12	15.3	-35	13	12	6	-3
12	16.6	14	13.1	-17	16	11	3	-9
13	15.1	16	11.9	0	18	9	1	-16
14	13.9	20	10.9	17	19	7	6	-25
15	13.1	25	10.3	34	21	5	-10	-32
16	12.5	27	9.9	39	21	3	-14	38
17	12.1	28	9.5	42	20	0	-18	
18	11.8	29	9.2	44	19	1	-20	
19	11.5	30	8.9	44	18	3	-23	
20	11.0	30	8.4	43	15	7	-28	
21	10.6	31	8.1	42	14	10	-32	
22	11.3	30	8.5	43	17	4	25	
23	11.5	30	8.9	43	18	-2	22	
24	10.9	25	8.3	29	13	-7	-26	

VK EAST — ASIA

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	27.1	14	22.4	...	19	23	22	18
2	28.4	14	21.7	...	18	23	23	19
3	29.0	14	22.6	...	18	23	23	20
4	29.4	14	24.3	...	19	24	24	21
5	29.1	15	23.8	...	21	25	24	21
6	28.1	15	22.8	-31	23	26	24	20
7	26.6	16	21.5	-16	26	27	24	19
8	25.0	17	21.1	7	32	29	25	18
9	23.6	19	18.8	32	37	32	25	16
10	21.9	21	17.4	40	38	30	22	12
11	20.7	21	16.4	45	38	29	20	8
12	19.9	22	15.8	49	38	28	18	5
13	18.8	23	14.9	52	37	25	14	0
14	17.5	24	14.0	51	35	21	9	-7
15	16.4	24	12.9	50	32	17	4	-15
16	15.4	25	12.1	50	29	13	-1	-22
17	13.9	26	10.8	48	24	5	-12	-37
18	12.1	27	9.4	46	16	-7	-30	
19	10.9	27	8.4	44	8	-21	...	
20	11.0	27	8.5	44	8	-20	.	
21	16.9	20	13.3	32	28	16	4	-13
22	24.6	17	19.1	0	30	28	23	16
23	25.9	15	20.8	-21	25	26	23	17
24	26.3	15	21.4	-34	21	24	22	17

VK SOUTH — ASIA

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	20.3	12	16.5	...	13	15	11	3
2	20.6	12	17.0	...	12	14	11	4
3	21.1	12	17.8	...	12	14	12	5
4	21.1	12	17.7	...	12	15	12	5
5	21.2	12	17.5	...	13	15	12	6
6	20.9	13	17.1	...	16	16	13	5
7	20.3	14	16.5	-27	19	18	13	4
8	19.3	16	15.5	-7	22	18	12	1
9	17.9	21	14.2	31	30	20	10	-4
10	16.5	22	13.1	40	30	17	4	-13
11	15.1	23	12.0	43	27	11	-3	-24
12	14.0	24	11.1	45	24	5	-12	-36
13	13.3	25	10.6	46	21	1	-18	.
14	12.7	25	10.1	45	18	-3	-24	
15	12.3	26	9.7	45	16	-8	-30	
16	11.9	26	9.4	44	14	-10	-34	
17	11.6	26	9.0	44	11	-14	-39	
18	10.8	26	8.4	42	6	-23		
19	9.7	26	7.5	39	-6			
20	9.8	26	7.6	39	-4	...	...	
21	12.9	22	9.8	35	17	-2	-21	
22	16.1	16	12.4	2	20	11	0	-15
23	18.5	14	14.5	-21	18	15	8	-2
24	19.7	13	15.7	-36	15	15	10	1

VK WEST — ASIA

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	24.5	15	19.6	-31	21	23	20	14
2	25.0	14	20.3		19	22	20	14
3	25.6	14	21.2		18	22	20	15
4	26.7	14	20.4		18	22	21	17
5	27.2	15	22.7		19	23	22	18
6	27.4	15	22.6		20	24	23	19
7	27.1	16	22.2	31	23	25	24	19
8	26.2	16	21.3	-17	26	27	24	19
9	24.8	18	20.0	5	31	29	25	17
10	23.3	20	19.6	34	38	32	25	15
11	21.7	21	17.3	41	38	30	22	11
12	20.1	21	16.0	46	37	27	18	5
13	18.9	22	15.0	48	36	25	14	0
14	18.1	23	14.4	51	36	23	11	-4
15	17.1	23	13.6	51	33	19	6	-11
16	16.1	23	12.9	50	31	15	1	19
17	15.3	24	12.0	49	28	11	-4	-26
18	14.5	24	11.3	49	25	7	10	-34
19	13.2	25	10.3	47	20	-2	22	
20	10.8	25	8.3	42	3	-28		
21	10.9	25	8.4	43	4	-27		
22	15.5	22	12.3	41	27	12	-3	-24
23	20.1	17	15.6	2	26	21	14	3
24	23.3	16	18.4	-18	24	23	19	12

VK EAST — EUROPE

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	9.9	-1	7.2	-28	2	-9	-23	...
2	9.3	-9	6.9	-35	0	-10	-23	...
3	9.9	-9	7.4	...	0	-7	-18	-37
4	11.9	-5	8.3	...	0	-2	-10	-24
5	14.8	0	11.1	...	-1	1	-2	-11
6	17.6	4	13.2	...	-2	4	2	-3
7	19.4	6	14.6	...	-1	6	5	0
8	20.9	8	15.7	...	1	9	8	4
9	21.8	11	16.5	...	8	13	12	7
10	21.2	15	16.8	-39	16	18	15	8
11	19.6	17	15.6	-12	22	20	14	6
12	18.4	20	14.6	6	25	20	13	2
13	17.6	22	14.0	22	29	21	12	0
14	16.7	25	13.2	36	31	20	10	-4
15	15.7	26	12.4	41	30	18	6	-10
16	14.8	27	11.7	44	29	15	2	-15
17	14.1	28	11.0	44	27	12	-1	-21
18	12.8	29	9.8	43	24	6	-10	-32
19	11.5	30	8.8	42	18	-2	-21	...
20	11.6	28	8.2	41	17	-4	-24	.
21	10.3	29	7.7	35	13	-9	-30	..
22	10.6	20	7.6	19	9	-10	-30	..
23	10.5	12	7.4	-1	6	-9	-26	.
24	10.3	5	7.4	-16	4	-9	-24	...

VK SOUTH — EUROPE

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	10.7	5	7.6	-21	5	-6	-20	...
2	10.0	-3	7.2	-32	2	-8	-21	...
3	10.6	-6	7.7	..	1	-5	-16	-33
4	12.9	-2	8.8	...	0	0	-7	-19
5	16.2	2	12.0	...	-2	3	0	-7
6	19.2	5	14.2	...	-4	4	4	0
7	21.1	6	15.6	...	-5	5	6	3
8	21.5	7	16.6	..	-4	6	7	5
9	20.4	8	16.3	...	0	8	8	4
10	18.9	9	15.0	...	5	10	8	2
11	17.4	12	13.8	..	11	11	7	-2
12	15.9	15	12.5	-17	16	12	4	-8
13	14.6	19	11.6	7	20	11	0	-15
14	13.9	23	10.9	25	22	10	-3	-22
15	13.3	26	10.5	34	23	7	-7	-28
16	12.8	27	10.1	39	22	6	-10	-33
17	12.6	29	9.9	42	22	4	-12	-36
18	12.2	29	9.5	42	21	2	-15	..
19	11.6	29	8.9	42	18	-2	-21	...
20	11.0	30	8.4	41	16	-6	-27	...
21	11.7	29	8.1	42	19	-1	-20	...
22	11.1	26	7.9	32	14	-6	-26	...
23	10.1	19	7.8	14	7	-12	-33	...
24	11.1	12	7.8	-3	8	-5	-21	...

VK WEST — EUROPE

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	11.3	15	7.9	5	9	6	-23	
2	10.5	6	7.5	-14	3	-10	-26	.
3	11.1	1	8.0	-31	2	-7	-19	-39
4	13.6	3	9.2		3	0	-7	-20
5	17.3	5	12.7		2	5	2	-6
6	20.6	6	15.1		0	6	6	2
7	22.5	7	16.5		-2	7	8	5
8	23.9	8	17.6		-2	8	9	7
9	24.6	9	18.3		0	9	11	9
10	23.4	10	18.6		3	10	11	8
11	21.8	11	18.4		9	13	12	7
12	20.3	14	16.1	-32	16	16	12	5
13	18.7	17	14.8	-2	23	18	12	1
14	17.5	21	13.8	22	28	19	10	-3
15	16.7	23	13.2	35	30	19	8	-6
16	15.9	24	12.6	40	29	17	5	-11
17	15.1	26	12.0	43	29	15	1	-16
18	14.5	26	10.8	44	27	12	-1	-21
19	13.9	27	9.6	44	25	9	-5	-26
20	12.8	27	8.9	43	22	4	13	36
21	11.7	28	8.5	41	17	3	23	
22	12.1	27	8.3	42	18	-1	-20	..
23	11.0	29	8.2	40	14	8	30	
24	11.1	22	8.2	22	11	-7	-26	

VK EAST — EUROPE (Long Path)

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	11.0	2	7.3	-29	4	-3	-14	-31
2	10.9	5	7.4	-20	5	-4	-16	-34
3	10.6	8	7.3	-12	6	-5	-18	-38
4	10.3	11	7.2	-1	7	-7	-23	...
5	9.6	16	6.8	10	6	-12	-30	..
6	10.2	24	7.3	25	10	-9	-28	.
7	12.3	24	9.0	29	18	3	-12	-33
8	15.1	24	11.2	33	26	15	3	-12
9	12.3	21	9.5	14	18	6	-5	-23
10	12.2	13	9.3	-9	12	4	-5	-21
11	13.7	8	10.8	-35	8	4	-3	-15
12	13.1	1	10.3	...	3	1	-5	-16
13	12.6	-4	9.9	...	0	0	-5	-16
14	12.3	-8	9.6	...	-2	-1	-6	-16
15	11.9	-12	9.2	. .	-4	-2	-6	-16
16	11.4	-15	8.7	. .	-4	-2	-7	-17
17	10.9	-17	8.3	...	-3	-2	-7	-18
18	11.6	-14	8.7	. .	-4	-2	-6	-16
19	13.7	-6	10.8	...	-5	0	-3	-11
20	16.2	0	11.0	...	-5	1	0	-6
21	14.2	-2	9.6		-2	0	3	-11
22	12.8	-2	8.7		0	0	-6	16
23	11.9	-2	8.0	.	2	-1	8	-22
24	11.4	0	7.6	-39	3	-2	11	-26

VK SOUTH —EUROPE (Long Path)

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	10.7	5	7.6	-21	5	-6	-20	...
2	10.0	-3	7.2	-32	2	-8	-21	...
3	10.6	-6	7.7	...	1	-5	-16	-33
4	12.9	-2	8.8	...	0	0	-7	-19
5	16.2	2	12.0	. .	-2	3	0	-7
6	19.2	5	14.2	...	-4	4	4	0
7	21.1	6	15.6	...	-5	5	6	3
8	21.5	7	16.6	...	-4	6	7	5
9	20.4	8	16.3	...	0	8	8	4
10	18.9	9	15.0	...	5	10	8	2
11	17.4	12	13.8	..	11	11	7	-2
12	15.9	15	12.5	-17	16	12	4	-8
13	14.6	19	11.6	7	20	11	0	-15
14	13.9	23	10.9	25	22	10	-3	-22
15	13.3	26	10.5	34	23	7	-7	-28
16	12.8	27	10.1	39	22	6	-10	-33
17	12.6	29	9.9	42	22	4	-12	-36
18	12.2	29	9.5	42	21	2	-15	...
19	11.6	29	8.9	42	18	-2	-21	...
20	11.0	30	8.4	41	16	-6	-27	...
21	11.7	29	8.1	42	19	-1	-20	. .
22	11.1	26	7.9	32	14	-6	-26	..
23	10.1	19	7.8	14	7	-12	-33	.
24	11.1	12	7.8	-3	8	-5	-21	...

VK WEST — EUROPE (Long Path)

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	9.7	-13	6.7	..	-2	-9	-19	-36
2	9.5	-10	6.6	-35	-2	-10	-23	
3	9.2	-7	6.5	-27	-2	-13	-26	
4	8.9	-4	6.4	-19	-2	-15	-31	
5	8.5	-1	6.2	-11	-3	-20	-38	
6	9.0	5	6.7	-3	-1	-19	-38	. .
7	10.6	12	7.9	3	5	-10	-26	.
8	13.0	15	9.7	8	13	1	-12	-30
9	15.4	16	11.5	11	18	9	-1	-15
10	15.0	17	11.1	8	18	10	0	-13
11	11.4	11	8.9	-4	8	-3	-15	-34
12	10.7	3	8.2	-19	4	-6	-18	-36
13	12.6	1	8.5	...	2	-1	-9	-22
14	12.1	-5	8.1	..	-1	-3	-10	-22
15	11.6	-11	7.9	...	-4	-4	-10	22
16	11.3	-15	7.7	...	-5	-5	-10	21
17	11.0	-18	7.6	...	-5	-5	-10	-20
18	10.6	-20	7.4	...	-5	-5	-10	21
19	10.5	-21	7.4	..	-5	-5	-11	-22
20	11.2	-18	8.0	.	-6	-5	-9	-20
21	12.5	-12	8.6		-7	-4	-8	-17
22	11.3	-15	7.9		5	5	10	-21
23	10.5	-16	7.4		-4	-6	-13	-26
24	9.9	-16	6.9		-3	-7	-16	-31

VK EAST — MEDITERRANEAN

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	10.3	1	7.9	-26	3	-7	-20	.
2	10.7	-3	8.1	...	2	-5	-16	-34
3	14.9	3	11.2	...	2	3	-1	-11
4	21.1	8	16.2	...	0	8	8	3
5	25.9	8	20.2	...	-3	8	10	9
6	26.3	9	21.5	..	-4	8	11	10
7	25.5	9	20.7	...	-3	8	10	9
8	24.2	9	19.4	...	0	9	11	9
9	22.6	10	19.1	..	5	12	11	8
10	21.0	12	16.7	..	11	14	12	6
11	19.4	15	15.4	-27	17	16	12	3
12	18.1	18	14.4	-3	22	18	11	0
13	17.3	21	13.7	19	27	19	11	-2
14	16.4	24	13.0	35	30	19	9	-6
15	15.6	26	12.4	40	30	17	6	-10
16	14.9	27	11.7	44	29	16	3	-15
17	14.2	28	11.1	45	28	13	0	-19
18	13.1	29	10.2	44	25	8	-7	-29
19	11.9	30	9.2	42	20	1	-16	..
20	12.5	29	9.6	43	23	5	-12	-35
21	14.7	27	11.6	43	29	15	2	-16
22	12.4	23	9.6	23	18	3	-11	-33
23	11.7	17	9.0	5	13	0	-15	-36
24	12.4	12	9.5	-13	11	1	-10	-28

VK SOUTH — MEDTERRANEAN

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	10.3	5	7.9	-16	4	-8	-23	...
2	10.6	0	8.1	-33	3	-6	-18	-37
3	15.2	5	12.0	. .	4	4	-1	-11
4	21.9	9	16.9	. .	2	9	9	5
5	22.9	8	19.2	. .	-2	7	9	6
6	22.9	7	19.0	. .	-4	6	8	6
7	22.6	7	18.5	. .	-4	6	8	5
8	22.1	7	17.9	. .	-3	7	8	5
9	21.0	8	16.8	...	0	8	8	4
10	19.5	9	15.4	...	5	10	8	2
11	17.9	12	14.1	...	12	11	7	-2
12	16.3	15	12.9	-17	16	12	4	-7
13	15.0	19	11.8	9	21	11	0	-15
14	14.2	24	11.2	30	24	10	-3	-21
15	13.5	26	10.7	36	23	8	-6	-27
16	13.1	27	10.3	40	23	6	-10	-32
17	12.8	28	10.0	43	23	5	-12	-35
18	12.5	28	9.7	43	21	3	-14	-38
19	11.9	29	9.1	42	19	-1	-20	. .
20	11.4	29	8.7	41	17	-4	-24	...
21	12.1	28	9.2	42	20	1	-17	...
22	13.1	26	10.2	34	23	7	-7	-27
23	13.1	22	10.1	18	19	6	-7	-27
24	12.6	16	9.7	1	14	2	-10	-29

VK WEST — MEDITERRANEAN

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	9.5	13	7.3	6	1	-19		
2	9.8	5	7.5	-11	1	-15	-33	
3	13.8	8	10.9	-33	7	2	-7	-22
4	19.7	9	15.2	..	8	10	7	0
5	22.6	9	17.2	..	4	11	10	6
6	22.8	8	19.0		2	9	10	6
7	22.9	8	18.9		1	9	9	6
8	22.6	8	18.5		1	9	9	6
9	22.0	8	17.9		3	10	9	5
10	20.9	9	16.8		6	10	9	3
11	19.5	11	16.5	.	11	12	9	1
12	18.1	14	14.4	-21	17	14	7	-2
13	16.6	18	13.2	7	22	14	5	-8
14	15.5	22	12.3	32	26	14	1	-15
15	14.8	24	11.7	38	26	12	-2	-21
16	14.1	25	11.1	42	25	9	-6	26
17	13.5	26	10.7	44	24	6	-9	-32
18	13.1	27	10.3	44	22	4	-13	36
19	12.6	27	9.8	43	20	1	-17	
20	11.7	28	9.1	42	16	-5	-25	
21	10.8	29	8.3	41	12	12	-35	
22	11.4	28	8.7	42	15	-7	-28	
23	11.7	28	9.1	41	17	-4	-24	
24	11.1	23	8.6	26	12	-8	-28	

VK EAST — USA/CARIBBEAN

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	23.0	9	19.4	...	4	11	11	7
2	20.4	10	16.2	...	8	12	9	3
3	17.6	12	14.0	-38	12	11	6	-3
4	15.6	14	12.4	-14	16	10	2	-11
5	14.5	18	11.5	6	19	9	-1	-18
6	13.8	22	10.9	24	21	8	-5	-24
7	13.2	25	10.5	34	22	6	-8	-29
8	13.0	27	10.2	39	23	6	-9	-31
9	12.7	28	9.9	42	22	5	-12	-35
10	11.8	29	9.1	42	19	0	-19	..
11	10.4	30	8.0	41	13	-10	-33	..
12	10.9	30	8.3	41	15	-7	-28	..
13	14.1	27	11.1	44	27	11	-3	23
14	11.1	28	8.6	37	16	-4	-24	...
15	11.2	22	8.6	19	13	-4	-21	.
16	13.0	16	10.1	-1	14	4	-8	-26
17	11.7	8	9.0	-20	7	-2	-14	-33
18	12.2	2	9.3		4	-1	-11	-26
19	15.4	4	11.7		3	4	1	10
20	19.9	7	15.4	.	0	6	6	1
21	23.2	8	18.2		-3	7	8	6
22	24.6	8	19.6		-4	7	9	8
23	25.3	8	20.5		-3	8	10	9
24	25.5	9	20.5	.	-1	9	11	9

VK SOUTH — USA/CARIBBEAN

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	23.5	10	17.6	...	3	11	12	9
2	22.2	11	17.6	...	9	14	12	7
3	18.9	13	15.0	-39	14	14	9	1
4	16.7	15	13.2	-16	17	13	6	-6
5	15.5	18	12.3	3	20	12	3	-11
6	14.6	22	11.6	20	23	11	0	-17
7	14.0	25	11.1	34	24	10	-3	-22
8	13.7	27	10.8	39	25	10	-4	-24
9	13.4	28	10.4	43	25	9	-6	-28
10	12.2	29	9.5	43	21	2	-15	-39
11	10.6	30	8.1	41	14	-9	-30	...
12	11.0	30	8.4	41	16	-5	-26	...
13	13.5	28	10.6	44	25	9	-6	-27
14	12.7	27	9.9	36	22	6	-9	-31
15	12.2	22	9.4	17	17	2	-12	-33
16	12.1	13	9.3	-6	11	0	-13	-33
17	11.5	5	8.7	-26	6	-3	-15	-34
18	12.2	1	9.2	. .	3	-1	-10	-26
19	14.5	2	11.4		1	2	-3	-13
20	17.9	4	13.7		1	4	3	2
21	20.6	6	16.0		-4	5	6	2
22	22.0	7	17.5		-5	5	7	4
23	22.9	8	18.6		4	6	8	6
24	23.1	8	19.1	.	-1	8	9	7

VK WEST — USA/CARIBBEAN

UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9
1	22.5	9	18.3	...	-3	8	9	7
2	20.1	9	16.0		1	9	8	4
3	17.3	9	13.8		5	9	6	-1
4	15.4	10	12.2		9	8	3	7
5	14.3	12	11.3	-28	12	8	0	13
6	13.5	16	10.7	10	15	8	2	18
7	13.0	20	10.3	8	18	7	-5	23
8	12.8	25	10.1	24	21	8	-6	26
9	12.6	28	9.8	34	23	7	-8	-30
10	11.7	30	9.1	39	21	3	-14	-39
11	10.5	32	8.1	41	16	-5	-26	
12	11.0	32	8.4	42	19	-2	-21	
13	14.1	30	11.2	45	29	15	1	-18
14	13.8	30	10.9	44	28	13	0	-20
15	12.2	25	9.4	23	20	5	9	30
16	11.5	19	8.9	6	15	1	12	33
17	12.8	13	9.9	15	13	5	-5	-22
18	12.0	6	9.3	-33	8	1	8	24
19	11.4	-1	8.7		4	0	9	-24
20	12.1	-3	9.2		2	0	-6	-18
21	14.5	0	11.4		-1	3	0	-9
22	17.9	4	13.7	.	-4	4	4	0
23	20.5	6	16.0		-6	4	6	4
24	21.8	8	17.4		-6	5	8	6

HAMADS

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● MORSE KEY, UK made, ea $20.00. Military Receiver AN/PRR9, 47-55 MHz (6 m amateur band) 1 channel, xtal controlled, 10 VDC ea $20.00. D Dauner Electronics, 51 George Cres, Georges Hall NSW 2198. Ph: 02 724 6982 Fax: 02 725 7850

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FOR SALE ACT

● DRAKE TR7 HF Transceiver. All solid state. WARC bands. General Coverage Receiver. Comes with desk mic & second VFO. All manuals. In excellent working order. Was $950 now $900 ono. Phone Richard (VK1RJ) on 06 258 1228 after hours.

FOR SALE NSW

● TET 3 BAND 2 EL MINI YAGI BEAM $125. Eddystone 770R Mk II VHF Coms Rx 19- 165 MHz VGC $200. Video Fader and detailer, $25 each. Will consider swap for valve radios on any of above. Kevin VK2GSU 043 28 4854.

● NATIONAL PANASONIC Transceiver RJX-1011D HF SSB/CW amateur transceiver. CW filter, T-Notch filter, RJX-V1011 external VFO, RJX-S1011 speaker. Top class transceiver with all manuals and instruction books, $1200. Niels VK2BKQ QTHR 02 481 8781.

● ICOM IC271A SN 02110 and ICOM IC471A SN 01180 with UX14 convertors and CT16 satellite interface, the pair $1500. Azden PCS 5000 SN 262968 2 m transceiver, $380. Tiny 2 TNC, $180. All above in good condition with manuals. Nigel VK2KJU 02 621 8939.

● SONY ICF-2001 general coverage receiver, $200. TELEREADER CWR-685A, $400. Kenwood Multi-PS20 SWR and power sensor, $30. LDF5-50A handline cable, 18 m, $150. Tom VK2OE (046) 21 2228 (evenings).

● 6 METRES CHEAP AND EASILY, Philips 828, complete instructions circuits and kit of necessary parts (No Xtal) to convert to 6 m. Posted in VK, $60. David VK2BDT QTHR (048) 21 5036.

● YAESU FT 1000 (not a demo model) purchased brand new still under warranty with manual. YAESU Mic MDI $5300. MFJ Differential T Tuner, 3KW, 6 months old, $600. Yaesu FL2000, $750. Kenwood TS930S, $1750. Deceased Estate of VK2CX. Doreen Evans, 25 Tomaree St, Nelson Bay, NSW 2315. (049) 81 1582.

FOR SALE VIC

● WWII & CLASSIC RADIOS. Moving QTH big clean-out, reluctantly sell..complete No.11, two No. 19s, Bendix 221AA, BC611C, two A510s complete in boxes, University valve tester, National HRO c/w 4 coil boxes, hundreds of valves and other bits and pieces. John VK3FH QTHR (03) 894 4298 anytime.

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● HY-GAIN TH3 Thunderbird Tri-band Beam. Selection of spares included. $300 ONO. Rex VK3ATZ Pearcedale (059) 78 7177.

● SATELLITE DISH 4 m/12 ft, good condition, $600 ONO. Yaesu YC500S freq counter 0-600 MHz, xtal oven, $300. Tower, triangular 3 sections 60 foot free standing, $400 ONO. VK3EO BH (03) 366 7707 AH (03) 889 6101.

● SATELLITE DISH 1.6 m pressed steel, complete with all mounting hardware and ground mount. New, never used. Neil VK3BCU (03) 390 2609.

● EXTERNAL SPEAKER ICOM IC SP3, very good, SN 06490, $18.00. Valda VK3DVT QTHR (03) 592 6236.

● KENWOOD TH-215A 2 m handheld with spare battery pack, charger and telescopic antenna, $290. ICOM 22S 2 m transceiver with power supply, external speaker, $160. Alinco 2 m linear amp, 30 W output, model ELH-230E $90. Ian VK3MZ Ringwood (03) 876 3643.

● YAESU FT1000 HF all mode transceiver as new condition. Complete with BPFI (B'pass filter) manual, mic, in original packaging. $4600. Rob VK3JE (060) 37 1262 or (03) 584 5737.

● CUSHCRAFT AV-5 5 band HF vertical antenna covers 80 m through 10 m ideal for limited space installation. Brand new, never assembled, still in original carton, $250 ONO. Adam VK3JKI (03) 579 3369.

● YAESU FT 757GX tcvr SN 4C 050417 VGC with mic and manual, $875. Ken VK3JII QTHR (03) 580 5347.

● KENWOOD TS820S, HF xcvr, remote VFO, CW filter, mic, handbook, ex cond, $595. Alan VK3AMT (03) 789 9106.

● "AMATEUR RADIO" magazines mid 1974 through current issue, bound in 4 ring binders, $80. Fluke 8060A digital multimeter c/w manual, 2 leads, 4 1/2 digit, true RMS signals 0-100 kHz, frequency 0-200 kHz, VdBm, res 0-300 MΩ, conductance 0-2000, continuity, diode test, volts & amps, relative measurement functions $350. Topward TFC 1207 1 GHz digital frequency meter, 10, 80 MHz & 1 GHz ranges, 8 digit display, c/w lead $250. Leader LSG11 signal generator 120 kHz-130 MHz, 120-390 MHz, $30. Goodwill GOS522 20 MHz dual trace oscilloscope c/w x10 probes & leads, $250. KYOKUTO FM144-10SXR II 2 m transceiver. True FM 10 W, 144-148.995 MHz, +/– 600 kHz offsets, 5 kHz steps, ideal for packet radio or general use; c/w mobile bracket, mic, & manual, $100. All of the above come c/w manuals and some spares and are in VGC. Bruce Kendall VK3WL. (03) 480 0111 BH, (052) 82 2664 AH, (03) 480 5320 fax.

FOR SALE SA

● YAESU FT-411 2 m handheld with accessories, as new, original carton, SN 9DO80112, $450 ONO. BP270 70 W solar panel, new, never used, $550 ONO. PBC 1216 16 amp regulator to suit, $70 ONO. John VK5KBE (08) 250 7259.

● PROGRAMMABLE 2 memory callers as per May 1986 Amateur Radio magazine, also updated May 1994 callers with separate speed controls each memory. $50 including postage. Lindsay VK5GZ QTHR (08) 31 6704.

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WANTED NSW

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● COLLINS equipment 52-S2 or 52-S1 receiver, SM-1 or SM-2 mic, 312B-5 control console, DL-100 dummy load, Astatic D-104 mic, good quality valve tester. Tom VK2OE (046) 21 2228 evenings.
● 1155 RECEIVER, good condition, Nick L20106 QTHR. Please write.
● VHF RECEIVER Hallicrafters S27 or similar that is 10 to 2 m and WW2 vintage. Also valve tester wanted as well. Ray VK2ZON (02) 489 8561.
● MORSE KEYS bugs and paddles, also any material relating to telegraphy. For future book. Ring after 6 pm. Steve VK2SPS (02) 9999 2933.
● YAESU SP101PB land liner speaker unit. Valves 1T4 1R5 etc. Microbee software. Singer Gertsch FIM-3 module. Ray VK2FW QTHR (063) 65 3410.
● EDDYSTONE S730/6 circuit all cost paid. Also looking for any copies of "The Australian Official Radio Service Manual". Kevin VK2GSU (043) 284 854.

WANTED VIC

● SOLID STATE ATV Tx for ATV Group, Geelong Radio and Electronics Society, preferably the one from VK3ATY and VK3ZJY's book "Building an ATV Tx". Bill VK3BWS (052) 29 3337 or Joe VK3DKR (052) 21 3125.
● ICOM EX 106 FM module to suit IC551D six metre 80 W tcvr or information on a possible source for above. Circuit diags, manual, etc would be appreciated. Cost covered. Adam VK3JKI (03) 579 3369.
● CIRCUIT for AWA Cadet carphone M5 4501A UHF and Pye circuit R460 and T460. David VK3YNB QTHR (053) 31 3829.
● CIRCUIT diagram, and manual if possible, for external VFO for Kenwood TR7200G 2 m transceiver. Will pay all costs. Steve VK3ZY QTHR (03) 807 4748.

WANTED QLD

● CAVITY FILTERS, 2 m band, suitable town repeater, two required but preferrably four. Contact Secretary, VK4BX (071) 25 1332 Hervey Bay Amateur Radio Club Inc., PO Box 829 Hervey Bay Qld 4655.
● INFO, MODIFICATIONS, circuits, manuals for following: Trio 9R — 59DS, Lafayette HA-600, Signal Corps BC-348 other than J, N or Q, multimeter Q- 1200, Q-1024 plus any help on RTV&H. Geloso Rx and Tx combination believed to be mid 50s to 60s. John VK4DJS QTHR.

WANTED WA

● CIRCUIT, manual, parts etc. for BWD521 CRO. Also tubes for HP608D Sig Gen 4042 and 4043. Gladly pay costs to get this gear going again. Dave VK6IV QTHR (09) 573 6435.

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VK3COD Nightly (weekdays) at 1030 UTC on 28.340 MHz and 147.425 MHz

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VK4WIT Monday at 0930 UTC on 3535 kHz

VK4WSS Tuesday at 0930 UTC on 3535 kHz

VK4WCH Wednesday at 1000 UTC on 3535 kHz

VK4AV Thursday at 0930 UTC on 3535 kHz

VK4WIS Sunday at 0930 UTC on 3535 kHz

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Print Post Approved - PP349181/00420